

Cyberspace Leadership

Towards New Culture, Conduct, and Capabilities

Gen Kevin P. Chilton, USAF

Air-Mindedness

Confessions of an Airpower Advocate

Lt Gen Robert J. Elder Jr., USAF, Retired

A Perfect Storm over Nuclear Weapons

VADM Robert R. Monroe, USN, Retired

Recent US and Chinese Antisatellite Activities

Lt Col James Mackey, USAF

Team Spirit

A Case Study on the Value of Military Exercises as a Show
of Force in the Aftermath of Combat Operations

Dr. John F. Farrell

Deterrence and Space-Based Missile Defense

Lt Col Lorinda A. Frederick, USAF



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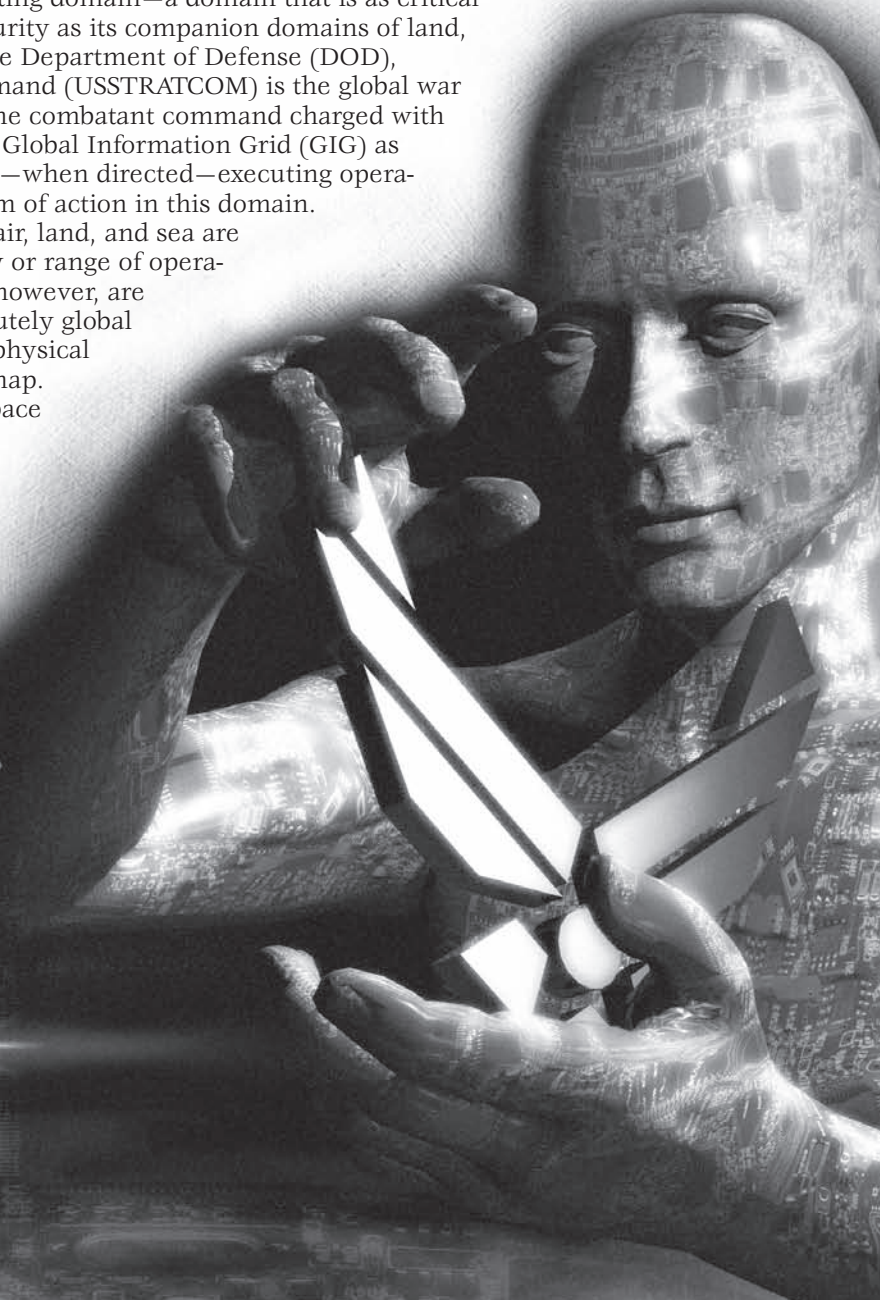
Towards New Culture, Conduct, and Capabilities

Gen Kevin P. Chilton, USAF*

War has always been a product of its age. The tools, tactics, and doctrine of how we fight have always evolved along with technology. In this first decade of the twenty-first century, cyberspace has emerged as a global war-fighting domain—a domain that is as critical to ensuring our national security as its companion domains of land, space, sea, and air. Within the Department of Defense (DOD), United States Strategic Command (USSTRATCOM) is the global war fighter for cyberspace. It is the combatant command charged with operating and defending the Global Information Grid (GIG) as well as planning, acting, and—when directed—executing operations to maintain our freedom of action in this domain.

As war-fighting domains, air, land, and sea are largely defined by geography or range of operation. Space and cyberspace, however, are cross-cutting domains, absolutely global in nature and indifferent to physical terrain or lines drawn on a map. Moreover, space and cyberspace

*This article is based upon remarks delivered by the author at the inaugural Cyberspace Symposium hosted by United States Strategic Command in Omaha on 7 April 2009.



are domains in which the United States can expect to be challenged. They are domains that are vital to civil and commercial activities, and are essential to the success of the global economy—but they are also critical to military operations. The global cyberspace domain is where information is moved today; military orders, logistics, and operational effects all depend on cyberspace. Freedom of action in cyberspace is essential to both war fighting and our national security.

Cyberspace, as one of USSTRATCOM's three primary lines of operation (space and strategic deterrence are the other two), is the least mature; yet, it is vitally important. Addressing the cyber threat is no small challenge and demands a new mind-set as we evolve the *culture* of war fighting in cyberspace, as we shape the *conduct* we follow in execution of the cyberspace mission, and as we strengthen the technical and manpower *capabilities* we bring to the cyberspace fight.

If, as the adage states, the past truly is prologue, a look back at lessons learned in the early days of military aviation may provide a compelling paradigm for developing cyberspace capabilities needed to address the challenges of today and tomorrow. How did we develop the capabilities of airpower for national security needs? What did we do right? What did we do wrong? And—the real question for today—how can we apply those lessons learned in the field of airpower to our development of cyber power?

To explore these questions, let's take a trip back in time to a fictional day and a fictional character in 1893 when 2nd Lieutenant Chilton graduated from the US Military Academy at West Point. He was undoubtedly steeped in lessons learned from the Civil War and in cutting-edge tactics for cavalry, artillery, and defensive fields of fire. He likely spent no time at all thinking about how one might use a new domain of warfare called “air” other than maybe considering the utility of tethered balloons for artillery spotting.

But 10 years later, in 1903, the Wright brothers flew. Even though their initial flight lasted only 59 seconds, it was a watershed event in history; suddenly there was a new domain available for human activity. Then, in 1926, thirty-three years after his

commissioning, Chilton found himself in a new kind of military. By then, not only had manned flight been added to the military tool kit in World War I, but also Chilton was thinking about how he was going to fight the next fight in that domain, how important it was to protect that air domain, and how that domain would grow in importance to commerce, transportation, and the economic development of this country.

Now let's fast-forward to reality and look at these milestones from a different perspective. The year is 1976, and 2nd Lt Kevin P. Chilton has just been commissioned an Air Force officer, is one year past having turned in his slide rule, and has bought his first HP-35 handheld calculator for \$275. The concept of a laptop or a desktop computer is still inconceivable. Yet, 10 years later, in 1986, when I was at the National Aeronautics and Space Administration (NASA), someone came in and put this “thing” in my office. He moved my files out of the way, set a bulky monitor with keyboard on my credenza, shoved another boxy device under my desk, and said, “Here is your computer.” It was a “Wright brothers moment” in cyberspace for me.

Now, 33 years later, in 2009, I am dependent upon cyberspace. I'm dependent upon it in my personal life. The country is dependent upon it for our economic way of life. War fighters around the world are dependent upon it to conduct operations, not just in cyberspace but in every other domain. All of this dependence has transpired in only 33 years—faster, in many ways, than the revolution of flight.

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In 1991, as I was working at NASA, we proudly upgraded the space shuttle's main computer by doubling its capacity from 128K to 256K. That's the capability we still use today to go to and from orbit in the shuttle—a mere 256K. I dare say we have more capability in our wristwatches today; the pace of change in this arena since the space shuttle first entered service has been absolutely amazing.

Let's continue with the airplane metaphor and go back to World War I for perhaps another helpful tale. In the early days of the war, the German aviators would often fly



alongside French aviators, and, at first, they viewed one another as noncombatants. They spent most of their time observing and collecting information on surface activities from the air domain. On occasion they were even known to pass close enough to see into each other's cockpit and would often wave as they went by. It was a rather chivalrous approach to this new domain. As the tradition went, they were enemies, but they would honor the civilities.

But then, as legend has it, one fateful day a German and a French pilot passed each other, and for some reason the German shook his fist at the Frenchman. The next day, when the German approached, he hurled some sort of missile at the French pilot, who became so incensed that he dove at the enemy, drew a small flask of port wine from his pocket, and bounced it off the exhaust manifold of his newfound antagonist.

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Though this story may be just legend, something of the sort surely happened to mark the end of pure courtesy in the air domain and the beginning of hostilities. What followed was a dramatic change in three areas. There was a change in the *culture* of air-borne war fighting, in the way we thought about how this new domain fit into the art of warfare. There was also a change in *conduct*, in the rules of engagement regarding how we intended to operate in this new domain of air. Finally, there was a dramatic and measurable change in the *capabilities* in this domain, in the level of investment to develop, employ, and sustain those capabilities.

I would argue that history has repeated itself in the newest domain of military and national security activity. We have moved past the civilities in cyberspace.

United States forces, as well as those of our allies and adversaries, now rely heavily on their computer networks for command and control, intelligence, planning, communications, and conducting operations. But these architectures are vulnerable. In fact, for more than 15 years, the US government and DOD networks have come under increasing pressure from probes and assaults from a diverse range of adversaries, from bored teenagers to criminal organizations to nation-states. Although we have detected illicit activity on our

networks for more than 15 years and employ resources to offer a comprehensive, multidisciplinary approach to protecting those networks, we need to do more.

All of us—myself included—are making it too easy for potential adversaries to exploit our networks today. Like the World War I aviators, we need a change in our *culture*, *conduct*, and *capabilities* if we are going to advance the state of the art and provide the protection and freedom of action we need in this domain.

Culture

The first step we need to take is to develop and to nurture a culture that understands the importance of cyberspace and integrates it into our operational activities at all levels. I know from personal experience how difficult it can be to change that culture. After the technician put that computer on my desk at NASA, I successfully ignored it for about a month. I dusted it on occasion, and I would often gripe about its being in the way of my in-box. Then one day I missed a meeting. I asked the person who had organized the meeting why he didn't tell me about it, and he said, "Well, I sent you an electronic message." (We didn't call them e-mails in those days.) I responded, "Why didn't you just holler at me?" We shared a desk in the same office; I didn't understand why he couldn't have simply spoken to me. Whereas I had not begun the cultural shift into cyberspace, my peer had moved on. What I saw as just a new convenience—sending messages on a computer in lieu of making a phone call or having a face-to-face discussion—this person saw as a new way of life.

In a broader sense, we have developed and reinforced a culture which assumes that the cyber domain (those computers on our desks) is there for convenience. We have not necessarily thought of computers as part of the war-fighting domain. Think about it! When there is a problem with the computer, whom do we call? We call the smart technician and say, "Get down here and fix my darn computer—it's not working," and the technician comes and fixes the machine, and that is usually the end of it. This is not

the sufficient level of attention for systems that are mission essential to war fighting today. Problems with the availability, reliability, and security of information in this domain are not just meant for the attention of the brightest technician in our organization. They are a commander's business.

This is the foundation of the cultural shift that we must make. We must now think about this domain, its tools, and its readiness as commanders should—as essential to successful military operations.

When I was a U-2 wing commander, I reviewed the maintenance statistics on my airplanes every day. Why? Because I could not fly if they were not maintained properly and if they were not prepared to operate. Likewise, we need to review the maintenance statistics and the readiness of our cyber networks. We are commanders, and we depend on them. I challenge anyone to claim that he or she is *not* dependent on cyber networks every day. This is a significant change in mind-set.

Our “flights” through cyberspace are not simply a convenience anymore; they are a necessity. We must recognize that we depend upon this domain and that we need these systems to conduct our fight today and tomorrow. We must recognize that we can fight in this domain, just as an air-to-air fighter can fight in the air domain, and that we can fight through this domain and affect other domains, just as an aircraft can drop a bomb on land and create effects in that domain.

As leaders we must also appreciate the vulnerability of this domain, not just its importance. We have to transition from a culture of convenience to a culture of responsibility. We must recognize that a vulnerability in one system can create a vulnerability in another system on the other side of the world, not just locally.

Every soldier, sailor, airman, and marine is on the front line of cyber warfare every day. Think about those who guard your bases, who stand there at the gate and make sure only the right people come in and keep the wrong people out. In cyberspace that role belongs to anyone who has a computer on his or her desk. That person is part of the front line of defense, whether he or she knows it or not. Changing this culture is

absolutely essential, and it is going to take time, focus, and, above all, leadership.

Conduct

In every other domain and every other system, one of the foremost things we focus on is our people and their training. It is the same in land warfare, sea warfare, air warfare, special operations, and space operations. We emphasize training because we know that our people, not our tools, are our greatest advantage in any conflict.

I am required to train on cyberspace security once a year. I get a message that blinks on my computer that says, “You are due for Information Assurance training, General Chilton. Get it done by this date.” Once a year! During the training, I get to read and study year-old tactics, techniques, and procedures used by an adversary who is modifying them every day, perhaps every hour. We are not training appropriately, and we need to change that.

We also need to implement an effective inspections process for cyberspace. As the commander of an aircraft wing, I expected my higher headquarters to give me an annual operational readiness inspection to ensure that I could carry out the mission I had been given. So I paid attention to maintenance, logistics, and the readiness of my air crews—their ability to fly the mission, do the job, and get back. What did I not pay attention to? The cyberspace tools that I needed to get them off the ground. Today, where are all the tech orders that our people use to maintain airplanes? Are they on paper? Are they on classified networks? No, they are on unclassified networks, and they are on laptop computers or handheld devices that are vulnerable. Are we worried that an adversary might try to change the tech orders on our maintenance manuals on the flight line? We ought to be.

Is cyberspace essential to current operations? Should we be inspecting the readiness of every organization that relies on cyberspace to conduct its operations? Should commanders care about that? Should they be graded on that? I believe they should.

If an airplane crashes, if a ship runs aground, if a tank goes off the road and



rolls inverted into a ditch, what is one of the very first things commanders do? They stand up investigation boards or mishap boards because they want to get at the root cause of the problem and fix it. Commanders study the causes, they develop lessons learned, they promulgate them through training, and they make sure the force learns from the mistakes. Then they determine the right level of accountability.

Do we do that in cyberspace? Do we have the tools to hold people accountable for not following rules and regulations? We do have a tool. It's called the *Uniform Code of Military Justice*. We have all the authority we need, but we cannot get this backwards. We can't hold people accountable if we haven't properly trained and equipped them. We must do that first. We have to properly train, properly equip, inspect readiness, conduct investigations of mishaps when they happen, and then hold people accountable for their behavior.

Many violations occur today in cyberspace and on our military networks—far too many. For some reason, some people feel that the rules don't apply to them. They view compliance with directions that decrease the vulnerability of our networks as an inconvenience. When we don't comply, we can be certain that adversaries will take advantage of our misbehavior and lack of discipline.

Another necessity of proper conduct in cyberspace is the exercising of centralized command and control, and of decentralized execution. Some form of unified control and oversight is absolutely necessary in this global domain that requires systems to operate in a synchronized and integrated manner to ensure effective defense and mission success.

When I asked last year how many Secret Internet Protocol Router Network (SIPRNET) and Nonsecure Internet Protocol Router Network (NIPRNET) machines were on the DOD network, it took more than 45 days to get the answer—and I'm not sure I got the right answer. Now, if I asked the chief of staff of the Army how many M-16s there were in the Army, I'm certain he could tell me within 48 hours. I know that the chief of staff of the Air Force could tell me how many M-9s there are in the Air Force inventory because every one of them is

signed in and signed out. There is 100 percent accountability for those weapons. Yet if we lose control of them, the danger posed extends only within the ballistic range of those weapons.

But we have some unknown number of computers on the GIG that have unknown configurations, are in unknown locations, and are being operated by unknown users. If these "weapons" are misused, they can affect operations on the other side of the world because their "ballistic range" is global.

Capabilities

Finally, we need to improve our capabilities significantly in the cyberspace arena. Our people need better tools, particularly for command and control at the operational level of war. Our operational component commanders who operate, defend, and execute the missions in this domain need tools that allow them to better manage the operation of and the defense of this network at network speeds. We need to operate at machine-to-machine speeds and as near to real time as we can in this domain to stay inside the turning radius of potential adversaries. We need to push software upgrades automatically and to have our computers scanned remotely with the latest antivirus software.

We also need common operating pictures, just like the ones demanded by commanders in every other domain. Today, if we look at our common operating picture in cyberspace, we will find places in the United States that show up as black voids on the map. Why? Because we don't know what is going on in those locations. Usually around many of those black voids are the fences of some of our military installations because we have put up artificial barriers to keep the centralized command and control authority and oversight outside the fence line. The claim is, "It's my network." No, it's not; it's an integral part of the entire network, and a vulnerability in "your network" is a vulnerability to the entire GIG. We need the capability to see the whole picture all at once and take action as needed when threats appear.

I believe that, ultimately, we have to be even faster than network speed if we're going to defend this network appropriately. How do we do that? I'm not suggesting that we defy the laws of physics. We do it by focused, high-tech, all-source intelligence that tries to anticipate threats before they even arrive. We have to be able to anticipate attacks and intrusions and, when we can, preempt those threats before they arrive at our bases, posts, camps, or stations—or at the laptops on our desks.

Lastly, what we desperately need in the capabilities area are people—cyber experts dedicated to and focused on this mission area. The services are great at organizing, training, and equipping air, land, sea, and space domain forces. We need to move forward in organizing, training, and equipping cyber forces to conduct these critical operations for the DOD.

Conclusion

Leaders in government, business, and academia have moved from ruminating about threats in cyberspace to treating them as real and present dangers. We know that we also must make this transition. We have seen government networks probed in the past, and I firmly believe that these intrusions will only continue to increase.

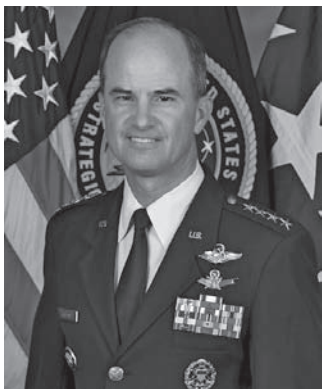
The cost of responding to intrusions has been in the hundreds of millions of dollars. But the costs go beyond dollars and cents and, more critically, include lost and/or ex-

ploited information that could be used against us in the future to inhibit our actions, interdict our operations, or put us in a position to be less effective in the other domains beyond cyberspace.

Our challenge lies in preventing attacks on our networks. It also includes finding ways to interdict attacks after they've been launched. If such attacks are successful, our challenge becomes not only making the adversary stop the attack, but also continuing to operate our networks through the attack.

We already do this in other domains. As I recall from my Air Force training, when a simulated threat of a chemical or biological attack occurred, we went out in our mission-oriented protective posture (MOPP) gear and fixed airplanes, loaded airplanes, and flew airplanes. We conducted operations in a hostile environment. That's what operating under attack in cyberspace is going to be like. We will need to fight through attacks and ensure we can continue to operate in cyberspace in at least an adequate fashion so we can continue to enable and support operations in every other war-fighting domain.

In this era of increasing dependency on cyberspace amid increasing threats to our systems in that domain, it is essential that we make these necessary adjustments in culture, conduct, and capabilities. We do not conduct activities in the new domain of cyberspace for convenience—we conduct them out of necessity. That makes successful operations in cyberspace everyone's business—especially leaders' and commanders' business. The time to act is now. ★



Gen Kevin P. Chilton

General Chilton (USAF; MS, Columbia University) is the commander of United States Strategic Command at Offutt AFB, Nebraska. He assumed command 3 October 2007 and is responsible for the global command and control of US strategic forces to meet decisive national security objectives. The general oversees a broad range of strategic capabilities and options for the president and secretary of defense, which include space operations, cyberspace, and strategic deterrence. General Chilton's career spans three decades, beginning as a distinguished graduate of the US Air Force Academy class of 1976. A Guggenheim fellow, he earned his master's degree in mechanical engineering from Columbia University. He flew operational assignments in the RF-4C and F-15 and is a graduate of the US Air Force test pilot school. General Chilton is a command-rated astronaut and test pilot with more than 5,000 flying hours. He has flown on three space shuttle missions and served as the deputy program manager for operations for the international space station. The general commanded the 9th Reconnaissance Wing and Eighth Air Force, and served on the Air Staff and Joint Staff. Prior to assuming his current position, he was the commander of Air Force Space Command. Among his many decorations, General Chilton has been awarded the Legion of Merit, the Defense Distinguished Service Medal, the Distinguished Flying Cross, and the NASA Exceptional Service Medal. At his promotion ceremony in June 2006, he became the first astronaut to reach the rank of four-star general.



Air-Mindedness

Confessions of an Airpower Advocate

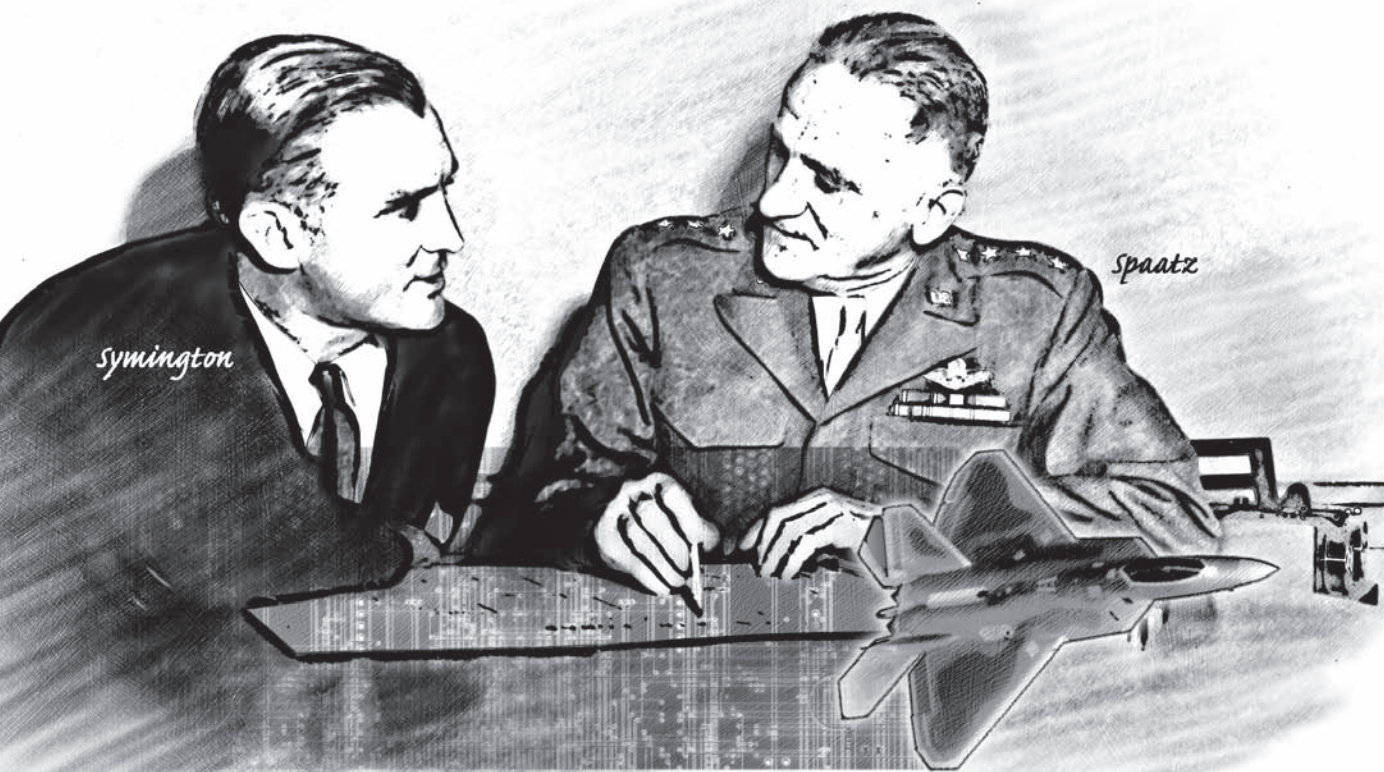
Lt Gen Robert J. Elder Jr., USAF, Retired

As Airmen face the challenges of justifying their requirements in the Defense Budget and continue to plan and execute air, space, and cyberspace operations around the globe, there are precious few opportunities to reflect on the events that made the US Air Force what it is today or to consider the value of an independent Air Force to the nation. Certainly, many events involving the United States Air Force look significantly different when viewed from a historical perspective—perhaps because we tend to view current events through bureaucratic lenses that are colored by the issues of the day. But when we review those same occurrences years later through a strategic lens, unclouded by news headlines and with the benefit of

history, our observations can lead to important new lessons which would have been difficult to recognize at the time.

Multidimensional Perspectives on Airpower

It is also important to recognize that Airmen, like any other group of people, tend to perceive events in a way that reflects their own institutional and bureaucratic perspectives. In a sense, each group's point of view is deficient by itself; however, taken together, they can provide a useful picture for detailed analysis. Arguably, people view the Air Force from at least four different perspectives: First, there is a national view, which re-



flects how the people of the United States see the Air Force generally, as through the eyes of Congress or the media. The second view is the perspective of joint force commanders and their representatives, which typically translates to how we are regarded in the Washington arena by the Office of the Secretary of Defense and the Joint Staff. The ground services—the Army and Marine Corps—view us from a third perspective: the air support we provide to their operations. It is important for Airmen to recognize the difference between multiservice tactical operations and interdependent joint operations so that they can provide the critically important fourth perspective, which is the employment of airpower at the operational and strategic levels. Finally, it is also important to recognize the intrinsic value of each independent service: to advocate for the innovation and technology that support the service's approach to military operations and national security. It is this facet of the Air Force which ties it to every other independent air force around the world. While each point of view is important, none provide a complete picture without the others. In recent times, there have been frequent attempts to view the Air Force through just one lens, which leaves these observers with a simple “black and white” view of our brilliantly colored, multidimensional institution.

Does the Nation Need an Independent Air Force?

Perhaps most importantly, we need to consider why the nation sees value in an independent Air Force. We should ask ourselves the question “Why did the Congress decide to establish the Air Force as an independent service in the first place?” Certainly, our Air Force was forged in the battles of World War II although much work had taken place over the years predating this conflict to establish our independence. But World War II

marked the first time that political leaders could clearly see what airpower provides the nation. To answer the question previously posed, we must consider that at the time of the creation of our service, four major operational commands existed: Strategic Air Command, Air Defense Command, Air Transport Service, and Tactical Air Command (listed in order of their size at the time of the Air Force's establishment in 1947). Here is the telling question: “Without the capabilities inherent in Strategic Air Command or Air Defense Command, would the nation have seen a need for an independent Air Force?” It seems reasonable to conclude that, as important as these missions are, it is unlikely that Congress would have established an Air Force for the sole purpose of providing airlift and air support to US ground forces.

Of course, today we have neither a Strategic Air Command nor an Air Defense Command; however, the organizations themselves are not as important as the fact that we continue to provide the nation with the capabilities these two commands offered when they did exist. Strategic Air Command could hold targets at risk without deploying large forces and putting them into harm's way. Air Defense Command made it difficult for an adversary to threaten the people of the United States or its global interests with attack. Nevertheless, we have demonstrated these capabilities in recent years but didn't recognize the significance of our activities because we understood the events only in the context of the bureaucratic issues we faced at the time. Since our reorganization in 1992, which was based largely on functional alignment, Air Force members have tended to view events through a mobility perspective, a combat air forces perspective, or a space perspective rather than an Airman's perspective. We need to recognize and reinforce the idea that the value of an independent Air Force lies in the synergy it provides across these functional capabilities—not in the effective-



ness or efficiency of the independent capabilities themselves.

We can also understand the value of the US Air Force by comparing our use of the air domain with that of the other services' aviation forces. The Army optimizes its air arm to provide organic mobility, surveillance and reconnaissance, indirect fires, and close air support to tactical forces in battle. Naval aviation has the primary role of protecting the fleet; however, by moving to littoral regions in the vicinity of military operations and conducting flight operations from the sea, it provides the nation a unique capability for presence around the globe. Rather than support its infantry with airpower, the Marine Corps fully integrates aviation with its infantry forces, functioning as a single, interdependent, ground-centric force that can operate from land or sea. Only the US Air Force has historically operated from garrison locations to project power at long distances, employing "effects" platforms (strike, airdrop, surveillance/reconnaissance, and air superiority aircraft) enabled by our "strategic" tanker capabilities. The Air Force offers exceptional support to ground or maritime operations but has the unique ability to deliver global and theater effects from its garrison locations. We demonstrated theater-wide reach and power in World War II, extending this capability worldwide during the first two decades of the Cold War.

The Legacy of Strategic Air Command

People who grew up in the 1950s and 1960s saw an abundance of movies about World War II in theaters and on television. The nation was captivated by its "flyboys." When people thought of the United States Air Force, they based their thinking on movies like *Twelve O'Clock High* that showed bombers, protected by long-range fighters, changing the course

of history and the nation's approach to warfare. Of course, in these two decades, people were also very familiar with the significance of the nuclear bombs dropped on Hiroshima and Nagasaki. As Strategic Air Command evolved, it transformed from a primarily conventional bombardment command to an organization almost exclusively focused on nuclear deterrence. (Recall its motto Peace Is Our Profession.) The command not only possessed bombers but also controlled the tankers that made it possible for those bombers to reach their targets on the other side of the globe. The bomber crews understood the tanker mission well, and the tanker crews understood their contributions to the bombing mission very well. However, both of these capabilities focused solely on delivering nuclear weapons against targets in the Soviet Union. The value of long-range air strike came under scrutiny early in the 1960s with the introduction of intercontinental ballistic missiles (ICBM), but bombers continued to play an important role in the nuclear "triad." Air Defense Command, not Strategic Air Command, experienced a significant decline in resources because the nation no longer saw a need to maintain a robust strategic air defense against air attack. Interestingly, the Soviet Union did not match the United States in this regard—it continued to maintain and expand its formidable air defense capability.

The Evolution of Tactical Airpower

Not a popular war but certainly a watershed event for the Air Force, Vietnam involved large numbers of ground forces participating in what we called at the time "limited intensity conflict." Moreover, Vietnam was definitely not an air-minded campaign—the primary measures of effectiveness were casualty ratios, not the attainment of operational or strategic objectives. Of significance to

Airmen, Vietnam dramatically changed the way we look at airpower: rather than a means to avoid attrition warfare, it became a critical enabler for force-on-force conflict. With increasing numbers of ICBMs and now submarine-launched ballistic missiles, we took bombers off alert and deployed them to Southeast Asia to become part of the war effort. It soon became clear that the bomber crews, which had operated independently throughout the Cold War, did not know how to integrate with other combat air forces. The loss of 15 B-52s during Linebacker II serves as an example of this failure to exploit the benefits of force packaging. The Vietnam experience convinced Air Force leaders of a critical need to better integrate Strategic Air Command's capabilities with those of Tactical Air Command—one of two primary lessons for Airmen from Vietnam. (The second concerned the need for a fighter optimized for air superiority.) However, we often forget that Linebacker II, which again demonstrated our ability to hold targets at risk without force-on-force conflict, was also responsible for driving the North Vietnamese to the negotiation table, which soon put an end to this conflict and brought home our prisoners of war. This should have been our primary observation: airpower not only can support tactical ground operations but also can enable other instruments of national power, such as diplomacy, to achieve strategic effects.

A number of events that would have huge effects on the Air Force occurred in the 1980s. First, negotiations for the Strategic Arms Reduction Treaty began in 1982 when the United States proposed substantial downsizing of both sides' nuclear arsenals. Second, the Goldwater-Nichols Department of Defense Reorganization Act of 1986 centralized operational authority in the Chairman of the Joint Chiefs of Staff as opposed to the Service Chiefs and designated the Chairman as the principal military adviser to the President, Na-

tional Security Council, and Secretary of Defense. Finally, in 1989 the Berlin Wall fell, signaling the approaching end of the Cold War. As a result, in the early 1990s, the Department of Defense had begun downsizing to a level called the "Base Force" when Saddam Hussein invaded Kuwait. The Air Force had worked aggressively to develop integrated conventional-bomber operations, and the F-15 fighter allowed us to dominate the skies over Iraq. The Air Force conducted a 38-day air campaign that enabled ground forces to occupy southern Iraq in only 100 hours. We proved that we had learned the lessons of Vietnam. Although we celebrated our victory, we also continued the massive downsizing of American forces commonly referred to as the Cold War "peace dividend."

Functional Reorganization of the Air Force

We took our bombers off alert in September 1991 as Gen Merrill McPeak, the Air Force chief of staff, launched an effort to reorganize a significantly smaller Air Force. Having no requirement to maintain an aircraft alert force, the service disbanded Strategic Air Command, divesting its bombers to a new command, Air Combat Command, and its tankers to another new command, Air Mobility Command. Because bombers did not sit alert, they were no longer considered part of the nuclear-deterrence force, which provided an important benefit at the time. Specifically, many countries that previously would not allow the United States to operate bombers from their soil now found conventional-only bomber deployments acceptable. However, negative consequences accrued as well: soon bombers were no longer regarded as an active element of the nuclear deterrence force, and the Air Force lost its sense of a common institutional mission. From this time forward, Air-



men would identify themselves as members of the combat air forces, mobility air forces, or the space community. Consistent with Goldwater-Nichols, members of the combat air forces would continue to be operationally assigned to multiple combatant commands; however, Air Mobility Command was operationally aligned to a single combatant command, US Transportation Command, and the space community remained aligned to a single combatant command, US Space Command. Airmen began to associate “global reach” with Air Mobility Command and “global power” with Air Combat Command. A brief attempt occurred to associate “virtual presence” with space. Capitalizing on our success in Operation Desert Storm, Airmen successfully argued the value of a joint force air component commander, but for the most part, the other services continued to divide responsibilities along geographic rather than functional lines. Since joint task force commands continued to be assigned geographically (with two notable exceptions led by Airmen: the functional joint task forces for Operations Northern and Southern Watch) and because Airmen were excited that they had control of air across an entire theater, to this day Airmen do not have an effective career-development path to become joint task force or regional joint force (combatant) commanders.

The bomber community, once the largest in the Air Force, downsized dramatically and transitioned from one known for “range and payload” to one known for its “persistence and payload.” The integration of bombers and fighters constituted a formidable capability, but the B-52’s relatively slow speed made it difficult to integrate into large force packages; consequently, the B-1 became the backbone of the conventional bomber force. In 1992, when Navy and Air Force fighters began flying patrols over northern and southern Iraq, the Air Force saw a diminishing role for bombers and other

long-range conventional strike capabilities in Airmen’s view of airpower.

Decisive Roles for Airpower?

In July 1995, the international community agreed to extend the threat of air strikes against Bosnian Serbs if they attacked any of the remaining “safe areas” in Bosnia, which included Gorazde, Tuzla, Bihac, and Sarajevo. Croatian forces entered the fighting in early August, and Operation Deliberate Force began on 30 August 1995 with attacks against Bosnian Serb military targets in response to a Bosnian Serb mortar attack on civilians in Sarajevo. The alliance conducted air strikes over 11 days during the period ending 14 September 1995. The threat of attacks from the air as well as from Bosniak and Bosnian Croat forces forced the Bosnian Serbs to send Serbian president Slobodan Milošević to represent their interests in negotiations that led to the Dayton Peace Agreement. As one source still reports, “Operation DELIBERATE FORCE proved that airpower can have a decisive role when serving achievable, clear policy objectives.”¹ However, looking back with a historical perspective, Airmen must realize that (1) airpower caused indigenous forces (Bosnians and Croats) to pose a threat to a much more powerful ground force and (2) airpower enabled the effectiveness of the diplomatic instrument of power. Bombing by itself did not produce the outcome, but without bombing, it is unlikely that Serbia would have negotiated with the North Atlantic Treaty Organization (NATO). Thus, Bosnia offers two important, though largely ignored, lessons for Airmen: airpower can enable indigenous ground forces to fight successfully and can enable other instruments of national power to become more effective.

In March 1999, NATO initiated Operation Allied Force to compel Milošević to stop the ethnic cleansing of Albanians in Kosovo and to withdraw Serbian forces

from the province. Although the alliance initially designed the air campaign to destroy Serbian air defenses and high-value military targets, it increasingly used air to attack Serbian units on the ground as well. Strategic targets included bridges across the Danube, factories, power stations, telecommunications facilities, and the headquarters of a political party led by Milošević's wife. Allied Force marked both the first operational use of B-2 bombers, which flew from Whiteman AFB, Missouri, to their targets and back, and the return of B-52s to high-altitude bombing. Although the role of airpower in bringing this conflict to resolution has prompted much debate, a RAND report suggests that Milošević decided to capitulate on 3 June because (1) he realized that his ethnic-cleansing strategy had not weakened NATO's resolve but had actually increased the alliance's commitment; (2) after a defiant initial response to the bombing campaign, the Serbian population eventually became war weary and willing to accept concessions; (3) damage to Serbia's infrastructure and economy undermined the support that Milošević required to ensure his regime's survival; (4) he expected NATO to transition to an unconstrained bombing campaign if its terms, by this time supported by Russia, were ignored; (5) NATO indicated that it was considering a future ground invasion (an effective coercion tactic even though it would have required at least two to three months of deployment preparation); and (6) NATO provided Milošević with an agreement that gave him some domestic political cover. The same RAND report notes that "damage to Yugoslav military forces and the 'resurgence' of the Kosovo Liberation Army generated little pressure."² Kosovo led to a debate regarding airpower's "decisiveness," but this tactical discussion is not as important to Airmen as the value of airpower in enabling diplomatic, informational, and economic instruments of power. The strategic value of airpower as an enabler for other instruments of na-

tional power is the lesson that every Airman should draw from NATO's victory over Milošević. It also offers a great lesson for Airmen involved with strategic-deterrence planning: Milošević conceded because NATO provided him an acceptable political outcome to end his aggression—and threatened him with significant military cost if he continued.

Just two years later, Operation Enduring Freedom gave Airmen an opportunity to reinforce long-established lessons of airpower. On Sunday, 7 October 2001, American and British forces began an aerial-bombing campaign targeting Taliban forces and al-Qaeda. Early combat operations included air strikes from B-1, B-2, and B-52 bombers flown from the continental United States and Diego Garcia, extended by tankers based in the Middle East; carrier-based F-14 and F/A-18 fighters operating in the Arabian Sea off Pakistan; and American and British Tomahawk cruise missiles. Later, land-based fighter aircraft would fly sorties into Pakistan from both the Middle East and Central Asia. From the very first day of the conflict, strategic airdrop provided humanitarian aid, clearly indicating that the United States was fighting the Taliban government and its support for al-Qaeda, not the people of Afghanistan. In early November, planners at US Central Command advocated the need to introduce US ground forces because they felt that the indigenous forces could not prevail against the Taliban without US and allied assistance on the ground. But on 9 November, the Northern Alliance, with the support of special operations forces, joint tactical air controllers, and airpower, fought against the weakened Taliban and captured Mazar-i-Sharif, taking control of Kabul just four days later as the Taliban fled the city. US and allied forces established their first ground base in Afghanistan southwest of Kandahar in late November, with strategic airlift as the only source of logistics for several months. The first lesson for Airmen from these Afghanistan operations is the immense



value of long-range strike, including bombers and fighters, enabled by tankers. The second lesson is the capability of airpower to enable the effectiveness of indigenous ground forces against more powerful forces. We also learned the value of special operations forces in support of airpower as enablers of indigenous forces. The third lesson reminds us of airpower's flexibility—it can deliver both bombs and humanitarian aid.

Finally, we can learn some great lessons from Operation Iraqi Freedom, the first of which corrects a common misperception that ground forces entered southern Iraq without the benefit of air superiority. Few people are aware of an operation called Southern Focus, which began in the summer of 2002 and ensured air superiority over southern Iraq when Iraqi Freedom's ground operations began in March 2003. Southern Focus was based on a change in rules of engagement that enabled more effective use of airpower than under the rules in force during Southern Watch. As a result, when ground forces entered southern Iraq, they did so without fear of bombardment from the air. Additionally, in northern Iraq, airpower and special operations forces combined to work with the Kurds to protect the oil fields. The original plan called for a ground invasion from Turkey, but when that option was no longer available, planners developed and successfully implemented a scheme employing airpower, special operations forces, and the Kurdish Peshmerga (an indigenous militia force). To prevent the possibility of a Scud missile launch from the Western Desert of Iraq—the other major concern—the Air Force, again working with special operations forces, developed a plan to put a blanket of surveillance and attack assets over the Western Desert with special operations forces conducting special reconnaissance of designated sites on the ground. As a result, the Iraqis launched no Scuds into Israel. Although operations in Iraq continue, several lessons for Airmen have

already become apparent. First, useful synergies result when airpower and special operations forces operate interdependently to attain asymmetric effects. Second, we saw that airpower can enable the effectiveness of a small or weakened ground force, as the Kurdish Peshmerga demonstrated in northern Iraq. Finally, Airmen can find different and innovative ways to achieve air superiority and ensure the protection of our ground forces.

Conclusion

Can we apply the Airman's perspective to suggest alternative approaches to other issues facing our nation today? Clearly we can—and we must. Airmen look at problems differently; thus, finding alternatives may require that we restate the problems we are attempting to resolve. For example, are the operations in Iraq “irregular warfare,” or are they “irregular peace” operations? Airmen should study Gen David Petraeus's “surge” in detail to understand the reasons for its effectiveness—specifically, the surge in manpower was accompanied by a change in strategy that focused on achieving stability rather than eliminating insurgents. Cyberspace serves as another example. Currently, we primarily focus cyberspace military operations in the areas of computer network operations and cyber security. Is cyberspace simply about the maintenance and security of our digital communications, or is it the foundation for a new “economic and social age” to replace the industrial age under which we operate as a nation today? The answer to this question has profound implications for the US military as well as our entire way of life. Finally, as we examine our priorities and mission as an Air Force following the past two years' events that involved bombers and ICBMs, we need to ask ourselves whether these were isolated occurrences restricted to the nuclear operations community or events symptomatic of our

overall loss of focus on why we exist as a service.

The international political environment has changed, but a quick review of recent military and national security operations suggests that the nation needs the US Air Force for the same reasons it was established in 1947:

- to sustain a full-spectrum force that encourages innovation, stimulates science and technology, and strengthens partners across the globe;
- to offer alternatives to force-on-force conflict by developing strategies based on operating interdependently with other US and partner instruments of power;
- to provide alternative joint courses of action that reduce the risk of US and friendly-force casualties when operating as an interdependent joint and coalition force; and
- to support ground commanders with the world's best air surveillance, close air support, and other supporting tactical capabilities.

As we consider the role of the Air Force in the future, we clearly see that,

from its beginnings, our service has postured itself to protect America's homeland and citizens from attack, to help assure our allies and partners, and to contribute to the advancement of America's global interests. We do this with our airlift, long-range strike (tankers and attack platforms), surveillance and reconnaissance (air and space), force enhancement from space, and other capabilities inherent to air forces. To put this in clear terms that apply to all Airmen regardless of their functional specialty, "Airmen protect the nation and its global interests by conducting global, regional, and tactical operations through air, space, and cyberspace." In short, we Airmen are distinguished by our air-mindedness! ✪

Notes

1. "Operation Deliberate Force," *GlobalSecurity.org*, http://www.globalsecurity.org/military/ops/deliberate_force.htm (accessed 27 April 2009).
2. "Why Milosevic Decided to Settle the Conflict over Kosovo When He Did," RAND Research Brief, RB-71 (Santa Monica, CA: RAND, 2001), http://www.rand.org/pubs/research_briefs/RB71/index1.html (accessed 27 April 2009).



Lt Gen Robert J. Elder Jr., USAF, Retired

Lieutenant General Elder (BS, MS, DE, University of Detroit) served as commander, Eighth Air Force (Air Forces Strategic), Barksdale AFB, Louisiana, and as joint functional component commander for global strike, US Strategic Command, Offutt AFB, Nebraska, at the time of his retirement from the Air Force. He also commanded Task Force 204, activated in November 2007 to oversee the Air Force's nuclear bomber and reconnaissance activities in support of US Strategic Command. General Elder served as the first commander of Air Force Network Operations and led the development of the cyberspace mission for the Air Force. His staff experience includes senior leadership positions with the Joint Staff, Air Staff, Air Combat Command, and the North Atlantic Treaty Organization. He has commanded at all levels; led unit deployments to Southwest Asia, Europe, and the Pacific; and held senior command positions in Operations Southern Watch, Enduring Freedom, and Iraqi Freedom. Prior to his final assignment, he was commandant of the Air War College and vice-commander of Air University. A command pilot with more than 4,000 flying hours, including 83 combat hours, General Elder is a graduate of Squadron Officer School, Air Command and Staff College, Air War College, and the National War College.



A Perfect Storm over Nuclear Weapons

VADM Robert R. Monroe, USN, Retired

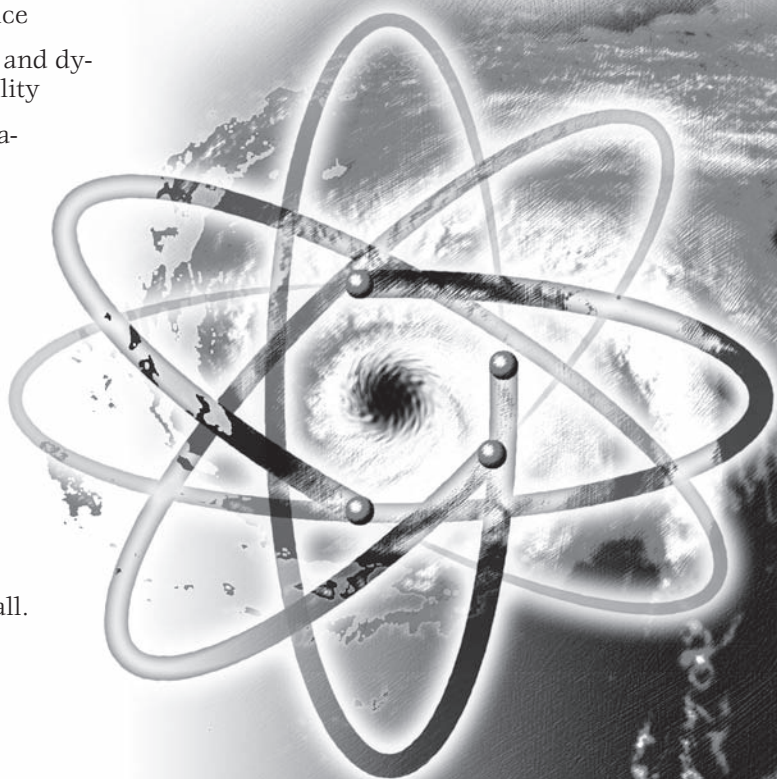
America faces a critical decision point in history. The nuclear deterrent that kept us safe for the past half century has deteriorated to the point of near failure, and we face a confluence of dangers—a “perfect storm”—that threatens our very existence as a nation. Our nuclear perfect storm is far more complex and dangerous than the meteorological perfect storm of 1991, which added this term to our vocabulary. Ours has been building for two decades since the Cold War ended, and today we are engulfed in the convergence of five immense challenges:

- Rapidly increasing nuclear threats of new and different types
- A lapsed and totally out-of-date strategy of nuclear deterrence
- An old, virtually irrelevant, and dying nuclear-weapons capability
- Unchecked nuclear proliferation on the verge of triggering a cascade
- Ill-advised and dangerous disarmament proposals designed to implement the vision of “a world without nuclear weapons”

Our overarching need, of course, is to meet all the interlocked challenges effectively. This article addresses each of these five and then suggests an integrated approach whereby national leadership can realize a successful outcome for all.

Nuclear Threats

Nuclear-weapon threats to the United States and its allies have steadily increased over the past 20 years, but because they're so different from the global thermonuclear threat of the Cold War, they have gone virtually unnoticed. Russia tops the list. First, it is still the only nation capable of destroying the United States. Second, Russia *must* increase its nuclear-weapons capability, as this is the only reason for its being considered a superpower. Third, over the past decade, the Russians have changed their military strategy to one based on the early use of nuclear



weapons in all military conflicts, large or small. Fourth, they have preserved thousands of Cold War-era tactical nuclear weapons—a force unmatched by any Western power. Fifth, they have a robust, active industrial base for producing nuclear weapons. Sixth, for two decades, they have focused on researching, developing, testing, designing, and producing advanced, highly usable nuclear weapons: very low yield, radiation intensive, and relatively “clean” but still immensely destructive. Seventh, they plan to deploy

Chinese objective calls for gaining full access to the Pacific through control of Taiwan, doing so peaceably if possible but through force if necessary. Since the United States has aligned itself to oppose such an action militarily, China intends to make any US action so extremely costly that we will opt for international pressure rather than armed combat.

Pakistan possesses nuclear weapons, and it is modernizing them. Its political situation is so unstable that those 100-odd weapons could soon fall into the

China poses a different type of nuclear threat. Chinese leaders recognize that they have now become a global, rather than regional, economic power. To advance to true superpower status, China must become a global military power as well.

tactical nuclear weapons in several ways, including the launching of cruise missiles from submarines. The US-Russian nuclear arms-control treaty now being negotiated to replace the Strategic Arms Reduction Treaty (START I) covers none of these tactical nuclear weapons. Finally, Russia is modernizing its strategic nuclear forces.

China poses a different type of nuclear threat. Chinese leaders recognize that they have now become a global, rather than regional, economic power. To advance to true superpower status, China must become a global military power as well. Thus, it has embarked upon a huge strategic-modernization program, ranging from space warfare and cyberwar capabilities to aircraft carriers and—most notably—nuclear weapons. The latter include greater numbers of advanced, high-yield strategic missiles with increased range to reach US targets, as well as nuclear antiship missiles. An early

hands of Islamic fundamentalists, for many of whom America is the principal target. North Korea and Iran are rogue states, well on their way to becoming nuclear-weapon powers, and, to date, the world has chosen not to stop them. The North Koreans have already conducted two nuclear-weapon tests, and if they successfully begin production of capable weapons, they would probably sell them to any state or organization able to pay. Iran may have a year or two to go before production, but once that occurs, it could very well transfer weapons to terrorist organizations (e.g., Hezbollah, Hamas, and al-Qaeda) for proxy attacks on the West.

Finally, in addition to remaining aware of the above specific threats, we must also fully prepare for the *unknown* nature of the future. With startling speed, friends can become enemies; hostile forces can take over supportive nuclear-weapon states; major US vulner-



abilities may occur unexpectedly; advanced weapons can present us with totally new threats; adversaries may form unanticipated alliances, greatly raising threat levels; and so on.

In sum, nuclear weapons exist, and they aren't going away—ever. There are tens of thousands of them in the world today. More states have them than ever before. Over half the world's population lives in states that possess nuclear weapons. Every such state in the world—with the sole exception of the United States—is modernizing its arsenal. Rogue states and terrorist organizations worldwide seek them unceasingly. On the research-and-development front, “fourth-generation” nuclear weapons loom just around the corner. Most importantly, basic nuclear-weapons technology—well known and available everywhere on the earth—will continually advance and never disappear. Consequently, small groups with modest technical qualifications can produce nuclear weapons that work well.

Given the great number of different threats from these weapons, the probability of our actually confronting some of them is quite high. Any such attack carries huge consequences—world changing. Thus, we urgently need a new, relevant US strategy of nuclear deterrence—and it must hedge on the side of strength.

Nuclear Deterrence

Unfortunately, all is not well with US nuclear deterrence. Initially, let's speak of deterrence in general, for it has been a powerful tool since prehistory. Deterrence is based upon *fear*. We alter the behavior of an adversary by threatening him. First we tell the leadership that taking a specific action, or failing to do so, will produce intolerable consequences for them. Then we convince the adversary, by reinforcing actions, that we have the *capability* and the *will* to carry out our threat. Deterrence has

proven a highly effective control mechanism since people arrived on the earth. Historically, successful completion of a difficult negotiation on any major issue has always required a threat of force in the background. The greatest benefit of deterrence is the high probability of achieving our objective without resorting to violence.

Nuclear deterrence has been with us since the dawn of the nuclear era. It *works*! We're all here today because it works. During the 40-plus years of the Cold War—the most deadly confrontation of superpowers in history—nuclear deterrence worked flawlessly. Those decades saw hundreds of major crises and dozens of “hot” wars; yet, the poised readiness of thousands of nuclear weapons, fine tuned to destroy the Soviets' most valued assets, was completely effective in preventing the use of a single nuclear weapon. But to keep deterrence working during those years, we had to redesign our nuclear weapons continually to meet changing conditions, threats, strategy, technology, Soviet leadership, and so on. Our nuclear deterrence brought about the end of the Soviet Union and the defeat of communism without violence.

Now fast-forward to the twenty-first century. Deterrence is nowhere to be found. What happened? The standard answer declares that no one can deter terrorists. On the contrary, we *can* deter them (but that's a topic for another day), and, more to the point, we should aim our nuclear deterrence at rogue states—today's most likely source of nuclear weapons for terrorists. We can most definitely deter those states.

So, “what happened?” amounts to a number of things. We didn't identify our enemy correctly; we didn't make the tough intellectual effort to recast our nuclear-deterrence strategy to meet this new threat; we didn't have the firmness to design, test, and build several types of new counterproliferation weapons; we convinced ourselves that it was inappro-

priate to threaten other nations; and—most importantly—we didn't engage the American people in a continuing national debate on nuclear deterrence, a debate as intensive as that maintained during the Cold War.

What form would nuclear deterrence take today? If we had prepared properly, it would develop like this. First, we identify our target—let's say, Iran—and issue this declaratory statement: "If you do not demolish your facilities for producing nuclear weapons, we will do it with military force, to prevent proliferation." We offer no deadlines, amplification, or negotiation. Note that we *never* refer to our use or nonuse of nuclear weapons. Proper preparation would have attracted strong bipartisan support for the statement. Prior national debate would have produced public consensus on deterrence. This unanimity is vital in showing national will.

We then commence a continuing stream of powerful (and expensive) reinforcing actions, with both conventional and nuclear forces. With conventional forces, these actions—all highly publicized—include accelerated development of improved weapons specialized for this mission, visible weapons testing, rapid modification or procurement of these weapons, construction of mirror-image Iranian target arrays at our test ranges, intensive training with live weapons against these targets (shown on prime-time television), focused counterproliferation exercises, announced deployments, increased readiness, elevated worldwide alert levels, and so on.

Where do nuclear weapons come in? Because they're so all-powerful, devastating, and unique—a force that the adversary cannot withstand—nuclear weapons represent the real power in our deterrence. They provide a fearsome, credible backdrop for our conventional forces. Our reinforcing measures with nuclear weapons include immediate resumption of testing nuclear weapons underground as well

as accelerated design, testing, and production of new nuclear weapons with very low yield, great accuracy, reduced collateral damage, and increased security and controllability. We tailor individual designs for earth penetration, reduced residual radiation, and so on—all with much publicity, visibility, training, and exercises. The intensity of reinforcing actions cannot be overemphasized. Think back to the Cold War. The design and production of every nuclear weapon and every delivery vehicle (missile, aircraft, and submarine), as well as the assembly of large military forces that man and operate them, should be considered as reinforcing actions, to demonstrate national capability.

If we used deterrence in this manner today, Iran would abandon its nuclear-weapons programs without our firing a shot. Note that without the above-mentioned preparation, we could still make the declaratory statement and carry out the same reinforcing actions—which would probably not convince Iran that we would carry out our threat. In this case, we should conduct a single, very powerful conventional strike (earlier rather than later) against only one target—say, the Natanz enrichment facility. Immediately thereafter we should invite Iran to the negotiating table, at which our carrots should carry the day.

Deterrence is highly case-specific. That is, we must precisely shape any attempt to deter an adversary by holding at risk his most valued assets, and it must be totally credible under current US and world conditions. A deterrent approach that works against adversary "A" won't work against adversary "B"; moreover, one that works against adversary "A" today won't work against him in three years.

But US nuclear deterrence doesn't exist today. Although it represents the strongest element of US foreign policy and national security strategy, we've



dropped it from our tool kit. Our strategists, diplomats, and military don't understand it, and we've taken none of the necessary preparatory actions to make it credible. Some of these actions concern the nuclear-weapons arsenal we need to back up deterrence.

Our Failing Nuclear-Weapons Capability

US nuclear-weapons capability is in near-terminal condition: neglected, deteriorated, and dying. In the 1970s and '80s, it was the strongest the world had ever seen. What happened?

Briefly, in the euphoria over the Cold War's end, with the perceived absence of serious threats and a vision of peace for the foreseeable future, the United States took a number of unilateral nuclear-disarmament actions (e.g., a moratorium on the testing of nuclear weapons, a law prohibiting the design of low-yield nuclear weapons, and signing of the Comprehensive Test Ban Treaty [CTBT]). Today it's clear that we vastly overshot the mark.

New adversaries quickly appeared: rogue states, failed or failing states, terrorist organizations based in sanctuary states, and powerful groups with the potential to take over weak states. Many adversaries have no greater desire than to kill Americans and destroy our society—and they're eager to die in the process. They are also absolutely determined to acquire nuclear weapons in order to kill more of us. So our rosy vision of the future was off the mark. We repealed the design law after a decade of terrible injury to our nuclear labs, and the Senate denied ratification of the CTBT by a wide margin; however, the test moratorium continues, and it has done incalculable damage.

For almost 50 years, testing represented the hub of the nuclear-weapons wheel—"ground truth." It was the way we pursued science, trained designers,

validated designs, certified warheads, found problems, identified fixes, verified solutions, integrated the Department of Defense (DOD) and predecessors of the National Nuclear Security Administration into a tight-knit user-producer community, and the way we hardened key DOD weapons systems to survive the effects of nuclear weapons. With the hub gone, the remainder of the wheel isn't of much use.

And our mistakes continued—probably the second greatest being our belief that any US nuclear-weapons activity would undercut our nonproliferation policy. The exact opposite is true. A strong US nuclear deterrent acts as a powerful force to prevent proliferation. Unfortunately, United Nations (UN) stewards of nonproliferation progressively changed the objective of the "global nonproliferation regime" from preventing proliferation to nuclear disarmament. Accepting this, the US Congress, over the past decade, has denied all of the executive branch's nuclear initiatives: advanced-concepts research, the modern pit facility (the plutonium trigger), enhanced test readiness, the robust nuclear earth penetrator, and the reliable replacement warhead.

Today, nuclear threat levels are high, and the dangers diverse and even more challenging; yet US nuclear-weapons capability is close to total failure. We have undergone a two-decade, unannounced "nuclear freeze," taking us well on the way to unilateral nuclear disarmament:

- Our nuclear deterrent doesn't deter. Our stockpile consists of Cold War "massive retaliation" weapons, irrelevant against current adversaries, and the test moratorium denies us the capability to design new, appropriate, and credible counter-proliferation weapons.
- The absence of nuclear testing seriously reduces our confidence in the reliability and performance of existing nuclear weapons because of

ageing, radiation damage, deteriorated parts, replacements with untested parts, and so on.

- In this age of terrorism, our nuclear weapons must incorporate the very best in safety, security, and controllability, but we cannot do this without nuclear testing. Most warhead designs do not contain all of the available security systems, and we have not developed improved systems because we have no prospect for testing them.
- From the dawn of the nuclear era, no nuclear-warhead design has ever entered the stockpile without having the pit certified through nuclear testing—until last year. We're now in the very unwise process of side-stepping this bedrock policy.
- Lab scientists, designers, engineers, and test personnel with test experience are almost gone. Those left can be counted on one hand. Morale is low. The luster of a nuclear-weapons career has diminished to the point that it impairs the recruiting of high-potential individuals. Furthermore, effective training of the new generation is just not possible without nuclear testing.
- For 17 years, our nuclear-weapon scientists have been prevented from pursuing a robust advanced-concepts research program. In this era of rapidly advancing technology, the test moratorium has denied us knowledge of "what's possible?" and an understanding of new threats we may face.
- The crown jewels of America's nuclear-weapons capability are not our warheads, weapons, or stockpile but *our designers of nuclear weapons*! We depend totally upon the judgment of designers to resolve every question, issue, or unknown regarding the effectiveness

and reliability of each weapon. And designers learn their trade by *testing*, without which we'll have the blind leading the blind.

- The inability to test undermines American science. For centuries, employment of the "scientific method," with testing as its central element, has been responsible for mankind's scientific and technological advances. We define a problem or unknown; develop a hypothesis for its solution; design a test of the hypothesis; predict test results; run the test; compare actual results to those predicted; adjust the hypothesis based upon test differences; and repeat the process. We cannot do this without testing. In a field as important as nuclear weapons, our scientists must not be denied use of the scientific method.
- Much of our nuclear-weapons infrastructure (laboratories, test facilities, production plants, etc.) is antique and deteriorated. The heart of the nuclear-weapons business—the production of plutonium pits (triggers)—no longer exists. The Rocky Flats plant closed 20 years ago, and every attempt to build a modern pit facility has been stopped.
- Similarly, the DOD has disassembled its nuclear-weapons capability by closing offices, reassigning specialists, and terminating functions. Few young officers today seek advanced degrees in nuclear physics or engineering, and few become nuclear-weapons specialists. Little attention is given to strategic thinking about nuclear weapons; development of tactics; strategy games involving nuclear weapons; and military exercises featuring nuclear warfare.
- Without nuclear testing, survivability of the DOD's conventional and nuclear systems remains



largely unproven. Scientific research into the effects of nuclear weapons has atrophied, and we now have little capability to test US systems against these effects.

- This situation is possibly best summarized by Secretary of Defense Robert Gates, who recently stated that “no one has designed a new nuclear weapon in the United States since the 1980s, and no one has built a new one since the early 1990s. . . . The United States is the only declared nuclear power that is neither modernizing its nuclear arsenal nor has the capability to produce a new nuclear warhead.”¹ Each of the three processes involved (designing, testing, and producing) is a performance art; each requires a highly specialized team; and the teams have to work closely together. It will take many years of actual performance to relearn how to do it effectively.

Most of these degradations result primarily from the absence of testing, and most of them cannot be corrected without the resumption of testing. So let's look next at the world of nonproliferation, which caused the test bans and moratoria.

The Failure of Nuclear Nonproliferation

The proliferation of nuclear weapons is a threat like no other, and America has led the effort to prevent it from the start. The Baruch Plan and President Eisenhower's Atoms for Peace were notable beginnings. In the 1960s, the United States actively negotiated the Nonproliferation Treaty (NPT), seeking to prevent proliferation by limiting nuclear weapons to the existing five “nuclear-weapon states” (United States, United Kingdom, Soviet Union, China, and France—the five permanent members of the UN Se-

curity Council). In 1970 43 states signed the NPT, including the United States. Five signed as nuclear-weapon states, and the rest as non-nuclear-weapon states, as did all later signatories.

The NPT places no restrictions on the five nuclear-weapon states regarding developing, testing, producing, and deploying new nuclear weapons in any variety or numbers—and every signatory agreed to this. Currently 189 (of the 193) states have signed the NPT, and there are still only five approved nuclear-weapon states. The NPT represents the cornerstone of the prevention of global proliferation.

During the Cold War (which continued for the first two decades of the NPT's life), relatively little proliferation occurred, primarily because the tens of thousands of instantly ready US and Soviet nuclear weapons made acquiring them seem rather pointless. Eighteen nations started down the nuclear-weapons road, and all stopped.

The problems with the NPT occurred once the Cold War ended. Groups of states, activist organizations, arms controllers, antinuclear organizations, and so on, have piggybacked their objective—nuclear disarmament—onto “nonproliferation,” effectively hijacking the term. They didn't change the treaty itself; they just claim that it requires nuclear disarmament, which it does not.

Over the years, the UN, General Assembly, Conference on Disarmament, large blocs of states, and countless non-government organizations have totally shifted the NPT's focus from preventing proliferation to nuclear disarmament. Thus, for the past 20 years, the world has sought to force the United States (the soft touch) to move faster toward unilateral nuclear disarmament and has given little attention to preventing rogue states from acquiring nuclear weapons. Consequently, the NPT failed to stop first Pakistan, then North Korea, and now Iran from going nuclear. Clearly, nonprolif-

eration—as practiced today—is ineffective, dying.

If North Korea solidifies its nuclear-weapons status, it's likely that other neighboring states (e.g., Japan, South Korea, and Taiwan) will opt to go nuclear in self-defense. If Iran produces nuclear weapons, the same will probably occur with Egypt, Saudi Arabia, Turkey, and other Mideast states. These two regional nodes of proliferation will likely trigger global proliferation among both developed nations (which can make the move very quickly) and undeveloped ones (some 40 of which have already made early moves toward nuclear power, many probably regarding it as a preparatory step). This appalling prospect has caused some individuals and groups to grasp, in desperation, for the impossible—"a world without nuclear weapons."

A World without Nuclear Weapons

Sensing the likelihood of a global cascade of proliferation, two and a half years ago, four notable elder statesmen—George Shultz, Henry Kissinger, Bill Perry, and Sam Nunn—proposed the international objective of a world without nuclear weapons. They stated that they did not know how to get there, but they proposed a series of major nuclear-disarmament actions that should be taken (mostly by the United States) to stimulate other nations to follow suit.

Of course, arms controllers, disarmers, and the entire global nonproliferation regime seized upon this vision with delight, holding conferences, planning initiatives, forming alliances, writing articles, and reshaping other related movements into this one. A parallel international program, Global Zero, came into being. Recently, President Obama has publicly committed his administration to a world without nuclear weapons.

In the resulting euphoria and enthusiasm, no one is asking searching ques-

tions. We *must* ask—and answer—them before taking any action in such a huge and daunting endeavor:

- Is a world without nuclear weapons possible? Surely, we must answer this one before we start taking major actions that may have serious downsides or that may be irreversible.
- Is a world without nuclear weapons desirable? Regulation and enforcement have always proven essential in a civilized society.
- What dangers would we expose ourselves to? Our nuclear deterrent has kept us safe for half a century.
- If we achieved a world without nuclear weapons, how would we stay there? Basic nuclear-weapons technology is well understood worldwide.
- How would we verify compliance? It appears impossible.
- Since proliferation *increased* during the exact period when the United States was in a nuclear freeze, refraining from design and production of nuclear weapons and making draconian reductions in our stockpile, why should we believe that our making further reductions will *stop* proliferation? It seems clear that weakness is not the way to win the nonproliferation game.
- Is it not unwise for a nation to set an objective it does not know how to reach? Major commitments of time, people, and money may turn out to have been counterproductive.
- Do we have more effective alternatives for preventing proliferation? Simple enforcement of nonproliferation seems obvious.

Without addressing these questions, the Obama administration is moving forward rapidly with a large number of proposals to implement this vision of nu-



clear disarmament. Three in particular, planned for this year, are quite dangerous. First, ratifying the CTBT would condemn us permanently into living with irrelevant nuclear weapons as well as inexperienced nuclear-weapons scientists and engineers. Second, making major reductions in the number of weapons in our stockpile is unwise. We're still in the process of implementing the huge Moscow Treaty reductions by 2012, and we should stabilize there until our still-in-planning "responsive infrastructure" is in place to compensate for the reductions. Third, permanently canceling the reliable-replacement-warhead program—the only modernization program attempted by the United States in two decades—is extremely unwise. We've committed five years to preliminary development of this warhead, essential both to reconstituting the human capital of our industrial base and to extending the life of our overage weapons.

Historically, efforts to ban weapons have been unblemished by success. We would do well to examine the records carefully before launching such an ambitious undertaking. One of the most recent attempts is also one of the most instructive—the Kellogg-Briand Pact to outlaw war as an instrument of national policy, signed in 1928. Virtually all the major nations of the world subsequently subscribed to it. This occurred as these same nations prepared for World War II, the most destructive war in history, leaving over 60 million dead.

An ill-conceived initiative, "a world without nuclear weapons" cannot succeed. Rather, it would expose us to imminent real-world threats, prevent the urgently needed rebuilding of our decayed nuclear-weapons capability, and fail to stop the impending cascade of proliferation.

Path to a Successful Future

We can survive this perfect storm and secure a safe future by taking the fol-

lowing five major steps, appearing in priority order.

Forget about a World without Nuclear Weapons

Starting with the physicians' guide "first, do no harm" (although it may damage a few egos), we must drop the "world without nuclear weapons" objective and cancel the three ill-advised 2009 proposals designed to kick it off (listed above). We cannot realize this objective, however visionary and desirable, and these three early actions would do incalculable damage to our nation.

Stop Nuclear Proliferation

We must stop nuclear proliferation, the principal threat facing our nation—*now*. If we can hold the line at eight states with nuclear weapons, the world may, with luck, be able to manage the nuclear-weapons challenge for the long-range future.

North Korea's and Iran's nuclear ambitions, along with the world's weakness in handling this challenge over two decades, caused the current proliferation crisis. Now we are truly in extremis. If these two states succeed in going into production with nuclear weapons, proliferation will cascade. Many, many states will have them; terrorists will obtain them; they will see frequent use; and we will live in a world of nuclear horror and chaos from which there is no return.

We can avoid this only by stopping North Korea and Iran now—by military force, if necessary. This is an absolutely essential step, and we must take it. Actually, the cascade has already started, in a subvisibility manner, in anticipation that no one will stop the two rogues. We should first attempt deterrence, although without the years of preparation, it may well prove unsuccessful. But if we must use force, the cost of stopping these two rogue-state proliferators now will amount to only a tiny fraction of the future cost of not stopping them.

When the first of these states is forced to roll back its nuclear-weapons program, this action will create a whole new world. Nonproliferation will be alive and well. Once again, deterrence will be recognized as effective. Nations of the world will no longer feel threatened by nuclear aggression. We can achieve nonproliferation only by stopping proliferators.

Then we must convince the world of three realities. First, *nonproliferation requires enforcement!* There must be a cop on the beat. Ideally, this would become a collegial responsibility of the five NPT-approved nuclear-weapon states—and the world may eventually evolve to this point. But for now, the United States must take the lead, supported by those willing to help—hopefully, one or more of the other nuclear-weapon states. Second, nuclear weapons are of indispensable value. They ended the most destructive war in history, saving millions of lives. For almost half a century, they prevented a vastly more destructive war. Today, the presence of nuclear weapons in some hands acts as a damper on their use by others. For generations to come, having nuclear weapons in the hands of large, responsible states offers the only hope for the world. Third, the true beneficiaries of the NPT's inequality are not the five nuclear-weapon states, who shoulder a heavy burden, but the 180-odd non-nuclear-weapon states. The NPT protects them from threats by aggressive nuclear-armed neighbors.

Reestablish Nuclear Deterrence

For two decades, America has forgotten about deterrence, our most powerful foreign policy and national security tool. We must recover it and totally recast our nuclear-deterrence strategy to face current realities. The following five examples illustrate the immense scope of change needed to reach a new model of deterrence. In the Cold War, our objective was to deter the launch of nuclear weapons against us and our allies. Now, our pri-

mary objective must be to deter the acquisition of nuclear weapons by rogue states and proliferators. In the Cold War, we threatened retaliation. Now, to avoid immense damage, we must threaten preemption. In the Cold War, we threatened to use nuclear weapons. Now, we should threaten to use military force. In the Cold War, we threatened to target leadership, military forces, and nuclear weapons. Now, we should target, for example, facilities that produce nuclear weapons. In the Cold War, we considered our strike the onset of war. Now, we should consider our strike an element of the negotiating process.

Rebuild Our Nuclear-Weapons Capability

We must repair the widespread damage of a two-decade nuclear freeze. The president must issue a firm, clear statement to the effect that an *effective*, safe, secure, and reliable nuclear deterrent is essential to America's security, and that we will maintain it with the highest priority. We must then immediately repair the widespread damage by taking the following actions:

- Reestablish the reliable replacement warhead as a vital program to rebuild human capital and begin modernization.
- Initiate a national debate to inform the American people of the issues discussed in this article, leading to the strong public consensus and bipartisan majorities needed to carry the program through decades of recovery.
- Reestablish a continuing, robust research and development program in all fields contributing to advanced nuclear weapons.
- Terminate our unilateral test moratorium, leave the CTBT unratified, and establish the international understanding that the CTBT does not



apply to the five NPT-approved nuclear-weapon states.

- Revitalize the DOD's nuclear-weapons organizations and programs, recommencing the establishment of military requirements for new nuclear weapons to return credibility to our nuclear deterrence.
- Design, test, and produce new nuclear weapons needed for all national deterrence missions.
- Modernize our nuclear-weapons infrastructure to produce a smaller, less costly, more efficient enterprise, giving top emphasis to pit production.
- Revitalize the DOD's programs on the effects of nuclear weapons, including underground testing, to ensure nuclear survivability of vital military and civil systems.

Pursue Responsible Arms Control

In a proliferation-free world, we must lead the eight nations possessing nuclear weapons into a continuing series of verified reductions, with the goals of maintaining stability and ensuring that the five NPT-approved nuclear-weapon states have the nuclear capability to maintain order.

In sum, the five steps outlined above should successfully respond to the five challenges of our nuclear perfect storm, reestablishing our essential nuclear deterrent and creating an effective global program to prevent proliferation. ★

Note

1. Secretary of Defense Robert M. Gates (speech to the Carnegie Endowment for International Peace, Washington, DC, 28 October 2008), <http://www.defenselink.mil/speeches/speech.aspx?speechid=1305> (accessed 9 June 2009).



VADM Robert R. Monroe, USN, Retired

Vice Admiral Monroe (BS, US Naval Academy; MA, Stanford University) is a self-employed national security consultant. Admiral Monroe enlisted in the Navy during World War II, and in 1946 he entered the Naval Academy from the fleet. Commissioned in 1950, he served in destroyers, minesweepers, cruisers, and amphibious assault ships, including three commands at sea. He subsequently served in flag rank for 11 years, including (as vice admiral) positions as director of the Defense Nuclear Agency and director of Navy Research, Development, Test, and Evaluation. His Navy career spanned the Cold War as well as the Korean and Vietnam conflicts. Retiring from the Navy after 38 years, he joined Bechtel, a large, worldwide, high-technology engineering, construction, and management firm, serving successively as business line manager, vice president, senior vice president, partner, and senior counselor for 22 years. He currently serves or has recently served as a member of numerous advisory boards for the Department of Defense, Department of State, Department of Energy, National Aeronautics and Space Administration, and other government and private organizations. Admiral Monroe frequently authors papers on nuclear-weapons issues.



Introducing the “New” *ASPJ* and Focusing on Nuclear Weapons and Deterrence

Maj D. K. Stanford, USAF, Chief, Professional Journals

Notice anything different? Undoubtedly, those of you who are long-time readers of *Air and Space Power Journal* immediately spotted changes in the *Journal*'s appearance. We have altered the cover, table of contents, typeface, and layout. We did so not only to highlight (on the cover) our outstanding articles and improve readability, but also to modernize the presentation, make our in-house production more efficient, and improve our ability to publish electronically. We did not make these changes capriciously but carefully considered each one with respect to *ASPJ*'s long and distinguished history. In fact, we examined various iterations of the *Journal*, going back to the early 1960s, to draw inspiration. By taking an “evolutionary” approach, we believe that we’ve enhanced the presentation of *ASPJ* while preserving its legacy as the professional journal of the Air Force.

★ ★ ★ ★ ★

Speaking in Prague, Czech Republic, on 5 April 2009, Pres. Barack Obama declared that “the United States will take concrete steps towards a world without nuclear weapons. To put an end to Cold War thinking, we will reduce the role of nuclear weapons in our national security strategy, and urge others to do the same. Make no mistake: As long as these weapons exist, the United States will maintain a safe, secure and effective arsenal to deter any adversary, and guarantee that defense to our allies. . . . But we will begin the work of reducing our arsenal.”

This issue of *ASPJ* includes a number of topical and insightful articles that wrestle

with the two most important issues facing the United States—nuclear weapons and deterrence. Clearly, the commander in chief is committed to diminishing our inventory of nuclear assets. Because the US Air Force has a unique, historical leadership position in these areas of our nation’s defense, we have assembled articles by a number of contributors who offer thoughtful analysis on these topics. In our Senior Leader Perspective section, Vice Adm Robert Monroe, USN, retired—former director of the Defense Nuclear Agency—makes a compelling argument for reinvestment in and reinvigoration of our nuclear program. One of our feature articles, by Lt Col Lorinda Frederick, examines the function of space-based missile defense as part of US deterrence strategy. In another feature, Dr. John Farrell conducts a fascinating analysis of how the United States has historically used the Team Spirit exercise to deter and influence North Korea.

We are also privileged to present an article by Gen Kevin Chilton, commander of US Strategic Command, that examines cyberspace as an emerging war-fighting domain. Lt Gen Robert Elder, the recently retired commander of Eighth Air Force, has also contributed a piece in which he reflects on the unique purpose of the independent Air Force. Suffice it to say that this issue is replete with engrossing content that constitutes the finest thought and analysis on issues affecting the US Air Force. As always, *Air and Space Power Journal* remains a must-read for all air, space, and cyber power professionals. ★



We encourage you to e-mail your comments to us at aspj@maxwell.af.mil. We reserve the right to edit your remarks.

AMERICA'S TWO AIR FORCES

Here's the bottom line up front: As physicist Wolfgang Pauli famously quipped, "This is not right. It isn't even wrong." Lt Col Robert Spalding's article "America's Two Air Forces" (Summer 2009) is deeply flawed in both premise and argument. Meaningful analysis of our aircraft requirements demands sound methodology and critical assessments that minimize internal biases. Unfortunately, the author falls far short on both counts. He describes a requirement for a bifurcated US Air Force equipped to meet the demands of peer-competitor threats and irregular warfare, and then asserts that current aircraft-procurement plans will fail to meet either requirement. While there is some merit in his general assessment of roles and missions for his "Two Air Forces" (kudos to his discussion of irregular warfare), the analysis offered—which is inadequate and often specious—fails to support his conclusions. I will address his assertion that our Air Force should focus on a peer-competitor force structure.

The article's recommendation that we advance F-22/B-2 procurement by eliminating the F-35 is based on reasoning beset with egregious factual errors, key omissions, and questionable assumptions. Underpinning these is a recurring theme of "an independent air force," which not only is irrelevant but also introduces an undesirable bias that permeates the article.

The argument against the utility of the Air Force Joint Strike Fighter (more correctly, the F-35A) for peer-competitor tasking is factually in error, which undermines the author's F-22/B-2 proposal. Contrary to his claims, the F-35A offers a considerable advance over the F-16 in war-fighting capability and is probably the longest-ranged fighter in our inventory. Regarding the former issue, the article simply ignores the F-35A's new-generation sensor suite and

low-observable features. Lieutenant Colonel Spalding summarily dismisses the F-35A from the peer-competitor role, stating that it is deficient in range with respect to the F-22. This is exceptionally unlikely. According to Lockheed Martin's own Web site, the F-35A and F-22A have the same internal fuel capacity (18,000 lb.). This gives the smaller F-35A a clean aircraft fuel fraction of 0.38, about 31 percent superior to the F-22's figure of 0.29. Given their similar design technologies, the F-35A has an operational range comparable to (more likely, greater than) the F-22A's. In brief, the author's critical thesis that the F-35A has no place in our Air Force is unsupported by factual information.

In addition to the negative F-35 bias, the article is most deeply flawed by its assumption that peer-competitor threats and irregular warfare necessarily represent two distinct, polar entities. The unstated assumption is that deterring or combating a peer competitor must focus on conventional state-on-state warfare methods (e.g., the need for strike platforms to achieve the strategic effects as defined in the article). Our experience with the Soviets during the Cold War was that peer-competitor conflict (often by proxy) demanded capabilities that spanned the full spectrum of irregular and (so-called) conventional warfare. We must expand our concepts of threats to accommodate the differing philosophies, strategies, and methodologies of culturally diverse adversaries. China, in particular, is unlikely to indulge us with a conventional assault in the template of peer competitors of the past. Conflict with modern China will be (or already is) across a broad and complex domain of warfare that may bear little resemblance to conflict with Nazi Germany or even 1950s China. (I recommend reviewing the illuminating readings on China included in Air University's Air War College Edition 15 correspondence course.)

We must plan, train, and equip for peer-competitor threats. But that scarcely confirms a requirement for an expanded F-22/B-2 force structure; today's peer competitors demand a multidimensional response across the full spectrum of warfare (including irregular warfare). If nothing else, the fiscal realities facing our full-spectrum Air Force—which also provides tanker; transport; intelligence, surveillance, and reconnaissance; cyber; and space capabilities—preclude simplistic courses of action.

Col John J. Hernandez, Kansas Air National Guard
McConnell AFB, Kansas

ASSIMILATING UNMANNED AIRCRAFT SYSTEMS

Regarding the article "Assimilating Unmanned Aircraft Systems" by Air Vice-Marshal R. A. Mason, RAF, retired, et al. (Summer 2009), let us not forget that UASs are manned systems—just not manned as traditionally envisioned. The constant in warfare is man and the established principles; the weaponry is the variable.

Col Richard Baldwin, USAF, Retired
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WHY WE SHOULD END THE AVIATOR CONTINUATION PAY BONUS PROGRAM

I am reading the Summer 2009 *ASPJ* Ricochets and Replies. Although it's not likely that you want to continue the argument over Maj Brian Maue's article "Why We Should End the Aviator Continuation Pay Bonus Program" (Winter 2008), I wanted to toss in my two cents in favor of eliminating the bonus.

Bottom line, the author of the article couldn't be more right, and his detractors, especially those in favor of keeping the bonus as a "retention tool," couldn't be more wrong. Graduate students at Embry-Riddle Aeronautical University (ERAU) have been addressing this issue for years in many forms. As a 29-year career military aviator

who took the bonus not once, but twice, I can affirm that it has little true effect on retention. I was interested in the issue, so I too became one of the ERAU students looking at it.

My master's thesis focused on prior-service military airline pilots and the reasons they resigned from their military career (prior to retirement eligibility) to pursue civilian airline careers. Airline hiring, quality of life, personal time, and so forth, all contributed at a much higher percentage to their resignations than lack of a bonus. As a reference, in the 1990s it was possible to leave the military after 17–18 years, move immediately to an airline job, and at the end of an airline career be in much better financial condition than a 20-year retiree who then moved to the airlines. I also asked in the survey whether, in retrospect, a bonus would have kept the respondents in the military. The answers were resoundingly negative. One of my good friends, whom I actually had not talked to in several years, responded that "life was good on the other side of the fence."

Major Maue is correct in his implications that aviator retention is much more heavily influenced by life issues than the aviator continuation pay (ACP) bonus. As he says, highest on the chart is the potential for airline employment and the much better economic situation enjoyed by airline pilots *in a strong and vibrant economy*. This is closely followed by the perception of an improved quality of life and so forth. Based on my career military experience, the research for my thesis, and conversations with my numerous friends who have been military pilots who moved to the airlines, there is no doubt in my mind that the current high aviator-retention rate occurs in spite of the ACP bonus, not as a result. Quite simply, current military pilots have no other place to go. Military pay and benefits are great when the economy is sour. When the economy recovers, the flow will begin again, despite the bonus.

Col Will W. Gildner Jr., USAF, Retired
Washington, DC



CLEARED TO ENGAGE

With great interest, I read "Cleared to Engage: Improving the Effectiveness of Joint Close Air Support" (*ASPJ*-English, Summer 2008; *ASPJ*-Chinese, Spring 2009) by Maj Michael H. Johnson and greatly admired the author's profound understanding of close air support (CAS). Only after I finished the last line of the article did I notice the editorial note, which claimed that this was a great article. The editor was right.

I was, however, surprised to read that although the US Army provides the same CAS mission (rotary wing) as that done by the US Air Force (fixed wing), it has to be called "close combat attack" (CCA) instead of CAS to avoid "encroaching" on the conceived scope of responsibility of the US Air Force. The US military is regarded as the world's

most experienced joint operation force, yet it is still troubled by sectarian differences. This is really new to readers like me.

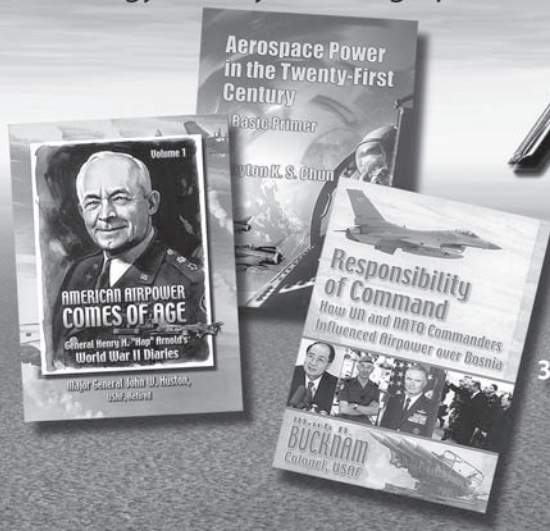
Understandably, the purpose of positioning a forward air controller (FAC) is to coordinate CAS. Allowing this FAC to receive information about both fixed- and rotary-wing aircraft would certainly help increase the timeliness as well as the effects of CAS. Keeping this in mind, the author recommends that the US Air Force and Army should jointly recognize that attack helicopters do perform CAS. Then the question is, will the guiding control of both rotary- and fixed-wing aircraft (and even of future unmanned aerial vehicles) be put in the hands of a FAC? (And, if so, when?)

Wang Zhi

Beijing, China

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In air combat, “the merge” occurs when opposing aircraft meet and pass each other. Then they usually “mix it up.” In a similar spirit, Air and Space Power Journal’s “Merge” articles present contending ideas. Readers are free to join the intellectual battlespace. Please send comments to aspj@maxwell.af.mil.

Damage Control

Leveraging Crisis Communications for Operational Effect

Lt Col Andrew J. Gebara, USAF*

After more than 6,700 days of continuous combat operations in support of US national security objectives, it is useful to evaluate the extent to which our nation’s enemies have adapted to the coalition’s asymmetric advantage in air and space. Since these enemies currently have no significant air defense at either medium or high altitude, it stands to reason that air operations should be able to function almost completely unfettered. Unfortunately, the notion that al-Qaeda and the Taliban have no air defense is woefully incorrect. Their air defense lies in the information operations (IO) logical line of operations (LLO), which takes the form of a concerted propaganda effort to discourage coalition air forces from using a valuable weapon—air power—in all of its manifestations.¹ Logically, the natural inclination goes therefore to the question, how can US operational leaders adequately defend against the IO propaganda threat?

Controversial air strikes are inevitable. Although we must make every effort to minimize bombing errors, history shows that some strikes will tragically go wrong. Similarly, the use of IO to degrade or defeat war-fighting advantages in the air is almost as old as airpower itself. We can find examples of employing IO in combat airpower during World War I, World War II, the Cold War, Korea, Vietnam, the Balkans, Iraq, and South Asia. Examining a few historical examples of enemy IO attacks can

help us devise counter-IO strategies to ensure our freedom to use air and space power. This article addresses two classic enemy IO attacks: those that followed the Chinese Embassy bombing in Belgrade during Operation Allied Force and the accidental bombing of civilians interspersed with terrorists in Azizabad, Afghanistan, in 2008. Each case study represents a different type of controversial air strike—and our enemies used each one to further their IO campaigns. Taken together, they provide a powerful rationale for offering future training to counter this threat through the use of crisis communications (CRICOMM) tactics, techniques, and procedures—a critical public affairs (PA) sub-capability of a campaign’s overall strategic communication (SC) plan.² US operational commanders, who have insufficiently adopted doctrine and measures in this regard, must drastically increase the level of importance given to this vital arena of warfare.³ Specifically, US leaders must accept CRICOMM as an essential war-fighting obligation and adopt a robust education and training program to allow commanders to combat terrorists in this realm of the battlefield.

Chinese Embassy, Serbia, 1999

Serbian government officials rushed to the scene of the embassy blaze. One of

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them, Interior Minister Vlatko Stojkovic, told Chinese diplomats "these criminals have to stop bombing. It's a demand of the whole world." There were initial conflicting reports of casualties. Senior Yugoslav official Goran Matic said there were no deaths among the 30 staffers living in the building. But Foreign Ministry spokesman Nebojsa Vujovic later said "there are deaths and injuries," without providing details.

—Veselin Toshkov, 1999

The bombing of the Chinese Embassy demonstrates the inevitability of error in combat operations. After several months of unsuccessful negotiations between North Atlantic Treaty Organization (NATO) principals and Serbian leadership, Allied Force combat air and maritime operations began on 24 March 1999.⁴ The US Army's Gen Wesley Clark, who served as Supreme Allied Commander, Europe (SACEUR), felt that NATO objectives could be met with only a brief air offensive, as had been the case four years earlier during Operation Deliberate Force, when Serbian leader Slobodan Milošević's capitulation resulted in the Dayton Peace Accords.⁵ Prevailing wisdom indicated that,

contrary to sound doctrinal practice, senior military leaders believed "the political objective was to prompt Milosevic to accept the Rambouillet peace agreement, and NATO calculated that by dropping a few bombs Milosevic would do so." At the outset of bombing, the MTL [master target list] consisted of a meager 100 targets, of which slightly over 50 were approved for the initial air strikes. The lack of approved target sets perplexed [Lt Gen Michael] Short, who recalled thinking that "SACEUR had us all convinced we didn't need very many targets, and we didn't need an air campaign, and Milosevic just needed a little bit of spanking, and it was all going to be done. We never really ran an air campaign in a classic sense."⁶

In contrast to General Clark, the Air Force's General Short, combined force air component commander for Allied Force,

supported a "punishment" strategy that targeted Milošević's supporters in Serbia proper, rather than the Serbian Third Army in Kosovo.⁷ General Short argued "many times to his superiors that the most effective tactic for the first night of the war would be a knockout punch to Belgrade's power stations and government ministries. Such a strike had worked in Iraq in 1991, and it was the foundation of air power theory, which advocates heavy blows to targets with high military, economic, or psychological value as a way to collapse the enemy's will."⁸

This strategic and operational mismatch resulted in a scramble for targets after Milošević refused to play into General Clark's plan. NATO attacks on Serbian targets gradually increased throughout the spring until 7 May 1999, when a B-2 aircrew struck what they thought was the Federal Directorate for Supply and Procurement in Belgrade with five 2,000-pound GBU-31 Joint Direct Attack Munitions.⁹ Unfortunately, the attack on this target, which was in actuality the Chinese Embassy, killed three and wounded 20 noncombatant Chinese nationals.¹⁰ General Short reacted to the incident as follows:

"Impossible. I can't imagine how we could have hit the Chinese embassy unless we just threw a bomb incredibly long or short. Let me do my homework, and I'll get back to you." So I called the Intel guys in, and said: "General Clark just says we hit the Chinese embassy. Get me a map and show where we targeted on Belgrade, and then where the Chinese embassy is." It wasn't anywhere near our targets. I called General Clark back and I said, "Boss, I guess it could have happened, but I don't know how. I don't think we did. I think it's bad reporting. I've looked at where the embassy is and where we targeted, and I just don't see how we could have thrown a bomb there. It may be a missile went up and came back down." . . . But then CNN confirmed that we hit the Chinese embassy. We clearly were stunned. This was not targeting that we had done—this was a target that was passed down to us as [a] good solid target."¹¹

Following the international outrage over the bombing, NATO forces were prohibited from attacking Belgrade for nearly the rest of the war, approximately 20 percent of the length of the operation.¹² According to General Short, "We had a circle drawn around downtown Belgrade, within which we couldn't hit anymore. . . . It took the Rock and Roll Bridge off the table, and many of the headquarters off the table. It essentially cleared the sanctuary."¹³

Numerous conspiracy theories have sprung up concerning the genesis of this tragic mishap, but the ultimate cause was a series of tactical-level blunders by civilian Central Intelligence Agency (CIA) analysts who passed on the target to the military for prosecution.¹⁴ This incident, which naturally caused international condemnation, was by no means isolated; in fact, the Human Rights Watch organization reports that between 489 and 528 Yugoslav civilians lost their lives in 90 different inadvertent strikes during Allied Force.¹⁵ NATO officials grudgingly acknowledged responsibility for most of the errant attacks, but only after lengthy periods of denial.

Azizabad, Afghanistan, 2008

I think that airstrikes probably are the most discriminating weapon that exists. The problem is that even when you hit the right target, there are times when innocents pay the price.

—Marc Garlasco, Human Rights Watch, 2008

The incident in Azizabad highlights an air strike that killed not only adversary combatants as intended, but also civilians interspersed with the enemy, unbeknownst to the allies. During the early morning hours of 22 August 2008, Afghan and coalition ground forces coordinated an attack in Azizabad, Afghanistan, after they received intelligence that a known Taliban leader, Mullah Siddiq, was located within the village.¹⁶ Approaching the village, ground forces came under attack from terrorists

and called for close air support.¹⁷ Subsequent fire from a US AC-130 Spectre gunship killed as many as 90 Afghans.¹⁸

Immediately, Taliban spokesmen complained that the attack resulted in the deaths of innocent civilians: the United States denied those claims, insisting that the dead were Taliban combatants.¹⁹ Cell phone video of casualties, however, revealed children among the dead, prompting numerous US and international investigations into the incident; two weeks after the attack, the United States announced that in addition to Taliban fatalities, as many as seven civilians had been killed in the strike.²⁰ A PA news release from Combined Joint Task Force 101 defended the US-led initial investigation:

The investigating officer took statements from more than 30 participants, both Afghan and U.S., in the operation. Additionally, the investigating officer reviewed reports made by ground and air personnel during the engagement; video taken during the engagement; topographic photo comparisons of the area before and after the event including analysis of burial sites; reports from local medical clinics and hospitals; intelligence reports; and physical data and photographs collected on the site.²¹

The United Nations (UN) disagreed with this assessment, its investigation finding "that some 90 civilians, including 60 children, were among those killed during military operations in the strife-torn nation's western Herat province."²²

Unfortunately for the innocents of Afghanistan, such events occur all too frequently. In addition to the undocumented atrocities committed by the Taliban on civilians, the UN estimated in 2008 that "more than 1,400 Afghan civilians were killed in the first eight months of this year. Of those, 395 were killed in airstrikes by Western forces. The number of civilians killed by US and NATO-led airstrikes has risen by 21 percent this year."²³

As a result of Azizabad and other high-profile incidents, US Army general David McKiernan, NATO commander in Afghani-

stan, directed a radical change in combined-arms tactics. The Canadian Army's Brig Gen Richard Blanchette described the change to Operation Enduring Freedom's rules of engagement: "Commanders are now under orders to consider a 'tactical withdrawal' when faced with the choice of calling in air support during clashes in areas where civilians are believed to be present. The goal of the order is to minimize civilian casualties, encourage better coordination with Afghan troops and discourage overreliance on air power to repel insurgent attacks."²⁴

Analysis

Given the extensive history typified by the preceding examples, our adversaries understand the operational and strategic

modern campaign plan. Many US operational leaders do not share this savvy; rather, they often underestimate the importance of accurate, timely rebuttal to enemy IO attacks, focusing their efforts on an ultimately fruitless attempt to achieve zero-defect air wars. In both case studies, the US CRICOMM response was markedly weaker than the enemy's attack.

It took the United States two months to release its official report of causation in the Chinese Embassy bombing, well after the conflict had ended.²⁶ After the mishap, Belgrade targets were essentially off-limits to NATO forces: Serb IO attacks had completed a task that the Serbian integrated air defense system could not. Recorded tapes of the B-2 attack on the embassy undoubtedly existed, but we could not release them rapidly due to security classification, resulting

"We are in a battle, and . . .
more than half of this battle is
taking place in the battlefield of the media."

value of IO far better than do US military commanders. In his infamous letter to now-deceased Iraqi insurgency chief Abu Musab al-Zarqawi, senior al-Qaeda leader Ayman al-Zawahiri described his strategic vision for IO attacks: "However, despite all of this, I say to you: that we are in a battle, and that more than half of this battle is taking place in the battlefield of the media. And that we are in a media battle in a race for the hearts and minds of our Umma. And that however far our capabilities reach, they will never be equal to one thousandth of the capabilities of the kingdom of Satan that is waging war on us."²⁵

In his captured writings, al-Zawahiri clearly showed his operational and strategic acumen. In fact, if anything, the Zawahiri-Zarqawi letter underestimates the importance of a coherent and timely IO strategy to complement other LLOs in a

in operational-level harm to the NATO campaign plan. In contrast to the rapid response of Serbian propaganda experts during the night of the attack, almost 11 months passed before Director of Central Intelligence George Tenet fired one CIA officer and reprimanded six others for their roles in the incident.²⁷

In Afghanistan, complaints of attacks on civilians are commonplace, more so because the Taliban don't wear uniforms. Moreover, many Western media organizations simply report al-Qaeda and Taliban claims as ground truth, despite evidence to the contrary. Anthony Cordesman, of the Center for Strategic and International Studies, explains that

a great deal of media reporting focuses on claims that civilians were killed or wounded. Some of these claims are correct, but many simply report what is claimed by the Taliban,

Al Qa'ida, and other sources; or by voices on the ground that claim not to have ties to insurgent activity in areas where UAVs [unmanned aerial vehicles], ground observers, and other IS&R (intelligence, surveillance, and reconnaissance) data make it clear that insurgents were present in the area and active at the target.²⁸

Internationally, the United States denied the Azizabad issue until cell phone video of the aftermath forced additional investigations, mentioned previously. Even after reopening the investigation, General McKiernan chose to bring in a general from US Central Command to lead it, remarking that "in light of emerging evidence pertaining to civilian casualties in the August 22 counter-insurgency operation in the Shindand District, Herat province, I feel it is prudent to request that US Central Command send a general officer to review the US investigation and its findings with respect to this new evidence. The people of Afghanistan have our commitment to get to the truth."²⁹ There is certainly nothing wrong with ensuring that the truth gets out, but we risk having this action perceived abroad as more stalling. Such evident inability to confront the enemy rapidly when he engages in IO attacks feeds right into his strategic IO plan. Maj Gen Charles Dunlap, USAF, explains that

the Taliban are keenly aware that if they can cause enough casualties or, ideally, take American or NATO prisoners as they swarm over the often sparsely manned positions, they will achieve a tremendous victory on the battlefield of public opinion.

What is frustrating them? Modern U.S. and coalition airpower. Relentless aerial surveillance and highly precise bombing turn Taliban efforts to overrun the detachments into crushing defeats. And the Taliban have virtually no weapons to stop our planes.

Instead, they are trying to use sophisticated propaganda techniques to create a political crisis that will shoot down the use of airpower as effectively as any anti-aircraft gun.³⁰

Recommendations

History has shown that many US operational leaders view air strikes gone wrong as an unfortunate PA problem to be dealt with as painlessly as possible so as to get back to the real task of war fighting. At the service level, the US Air Force does not define a PA mission to deal with this unfortunate inevitability. Air Force Instruction (AFI) 35-101, *Public Affairs Policies and Procedures*, thoroughly discusses the closest thing to such a mission: CRICOMM, including crisis actions; release of information to the media; and procedures to handle classified information.³¹ However, AFI 35-101 discusses CRICOMM in terms of its applicability to a natural disaster or mishap, not combat. This perspective contributed to the past problems described above and should be immediately discarded: we must consider CRICOMM operations an essential part of any modern kinetic air operation. As such, we should rewrite service instructions and ensure that doctrine reflects this requirement.

At the joint level, Joint Publication (JP) 3-61, *Public Affairs*, simply states that "it is incumbent upon JFCs [joint force commanders] and their PAOs [PA officers] to accommodate the media whenever possible . . . to counter adversary propaganda and erroneous information in the adversary's press. A commander's messages to the various publics must be timely, accurate, and project the purpose and scope of the mission."³² This doctrine is logical, but such guidelines leave initiative in the hands of the enemy. Left unwritten is the concept that CRICOMM should be considered part of combat; failure to contest the enemy in an IO environment unnecessarily cedes a critical part of the battlespace. JP 3-61's companion document—JP 3-13, *Information Operations*—makes only one reference to CRICOMM in its 119 pages, and the 2006 *Quadrennial Defense Review Execution Roadmap for Strategic Communication*, the Defense Department's attempt to synchronize IO, PA, and defense support to public diplo-

macy, fails to mention CRICOMM at all.³³ We must address this doctrinal deficiency. "Accommodat[ing] the media whenever possible" is far from embracing CRICOMM as an essential and inevitable part of joint combat air operations.

Traditionally, the services' PA professionals have displayed uneasiness concerning their place in the joint SC mission. AFI 35-101 explains that PA officers emphasize "truthful, credible, accurate and timely information to key audiences in order to enhance their understanding and appreciation for Air Force capabilities and contributions to national security, while maintaining due regard for privacy and communication security."³⁴ In contrast, IO may necessarily include deception.³⁵ Although this unease is understandable, denying CRICOMM a place in an SC campaign plan is tantamount to ceding this critical war-fighting tactic to the enemy. This is not meant to advocate untruthful CRICOMM as a subcategory of PA operations; however, the importance of the CRICOMM mission demands acknowledgement of its role in the SC battlespace, a position promoted by former National Security Council member Jeffrey Jones, a retired colonel: "That is not an argument to engage in propaganda; for the United States, truthful information is the best antidote and is exactly what its public affairs, public diplomacy, and information operators seek to provide."³⁶

In addition to modifying service and joint doctrine, US and coalition operational and strategic commanders must change their mind-set to acknowledge CRICOMM as a worthy facet of both SC and operational art, not as a necessary evil to hand over to junior PA officers as soon as possible. Commanders caught unprepared by an air strike gone wrong—whether unplanned (the Chinese Embassy incident) or planned but involving unexpected civilian casualties (as at Azizabad)—furtheracerbate a regrettable, but always potentially inevitable, situation. Compounding the errors of this inevitability is intolerable in modern joint kinetic air operations, espe-

cially in light of the ready availability of communication tools to address the IO effects of these operations. Air strikes will go wrong in the future; the only question remaining is, will operational and strategic commanders have the mental agility to defeat the enemy's likely IO counterattack?

We must develop leaders prepared to make the often tough decision to communicate openly and candidly in the wake of mishaps that compromise intended effects, especially when those mishaps kill and injure innocent civilians. Otherwise, we will continue to serve up propaganda opportunities that our adversaries will use to great effect in nullifying any potential operational gain. It seems obvious that the highest levels of military leadership must encourage CRICOMM education and that phases one and two of joint professional military education (JPME) must thoroughly address it. Until officers are educated in CRICOMM's importance and nuances, senior US military commanders will continue to respond poorly and see the mission degraded. Thankfully, minor efforts in this regard have recently been implemented at the phase-two level of JPME—but we must incorporate more.

Finally, we should include CRICOMM scenarios as a typical facet of air-operations training and must integrate CRICOMM into joint operational-level exercises such as Red Flag, the Joint Expeditionary Force Experiment, and the USAF Weapons School syllabus. When a Navy officer is pulled from a mission debrief in an Air Force–hosted exercise to get in front of cameras rapidly and explain why simulated Marine bombs fell on allied soldiers or civilians, we will have finally arrived at acceptable CRICOMM training.

Admittedly, the whole idea of media relations remains uncomfortable to many officers. However, even though naysayers argue that SC's efforts are overblown, others have soundly rejected the notion that engaging the media is a chore to be avoided. What was the Doolittle raid if not a kinetic attack to further an SC effort?³⁷ Gen George

Washington never would have fought the Battle of Trenton if he had not been keenly aware of the need to bolster the image of the Continental Army as an unbeaten force.³⁸ In both of these examples, US leaders recognized the primacy of SC for mission execution and the importance of the SC plan to the overall war effort.

This attitude is underscored by Senior Gen Võ Nguyên Giáp, former Vietnamese military commander:

We paid a high price [during the Tet offensive] but so did you [Americans] . . . not only in lives and materiel. . . . Do not forget the war was brought into the living rooms of the American people. . . . The most important result of the Tet offensive was it made you de-escalate the bombing, and it brought you to the negotiation table. It was, therefore, a victory. . . . The war was fought on many fronts. At that time the most important one was American public opinion.³⁹

Similarly, CRICOMM, well executed as part of an overall SC plan, can maintain the operational commander's critical requirement of remaining free to operate. General Dunlap explains the importance of this mission in the context of the global war on terror: "We must not reward the Taliban for deliberately putting civilians at

risk; it will only encourage them—and others—to make increasing use of innocents as defensive shields. The world will become an even more dangerous place for the truly blameless. The grim reality is that if our forces in the field are deprived of their most effective weapon, more than just coalition troops will die."⁴⁰

Conclusions

Kinetic air operations may indeed be surgical when compared to other types of fires, but they are in no way infallible. Mistakes are inevitable. In Belgrade and Azizabad, US operational leaders allowed the enemy to use IO in the form of propaganda to undermine US and coalition objectives. US leaders need to modify the conventional wisdom of CRICOMM as a necessary evil, embracing it as an inevitable part of warfare, no different from tactics or logistics. Only by adopting a robust education-and-training regimen in SC and its subcapability of CRICOMM will US leaders deny the enemy this critical LLO and maintain the freedom to prosecute operations in support of friendly operational and strategic objectives. ✪

Newport, Rhode Island

Notes

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Recruiting for 2030

Is the US Air Force Getting the Recruits It Needs for the Future?

Col (sel) Steven C. Marsman, USAF*

The Air Force has stated that it seeks not only 31,980 recruits in fiscal year 2009 to meet its needs for sustainment but also the right people with the right skills at the right time.¹ However, our service recruits Airmen, not numbers. The Air Force wants capable Airmen today who will become leaders for tomorrow. Will we meet our goal for 2009? Absolutely. Even though the number 31,980 represents about 4,000 more individuals than we recruited the previous year, more than likely, the Air Force will have little difficulty accessing this figure.² In fact, we will probably book this many into the system by the summer of 2009. Furthermore, the Air Force Recruiting Service (AFRS) almost certainly not only will get the right *number* of people but also will access recruits who match prerequisite skill levels and aptitudes at precisely the sequence and timing needed for all training pipelines. One question remains, though: will the Air Force attract the *type* of recruits it requires for the future? Obviously, this question is essentially qualitative rather than quantitative. Many individuals in the current ranks fear that the answer is no. They may be correct—but probably for the wrong reasons. A sufficient number of people with the proper cognitive ability or aptitude are available and willing to join. If we fail, we will do so because we lack insight about how to recruit and what we really need for the strongest possible Air Force. Thus, this article first addresses the challenges and

processes that recruiters face in their effort to meet stated mission goals. It then examines how policies, processes, and programs effectively concentrate on certain areas that emphasize diversity but, in so doing, may create new, currently unaddressed problems for future recruiting.³

Recruiting Challenges

Every day, Air Force recruiters work hard to find young men and women who will become leaders 20 years from now. They seek quality applicants who meet the service's stated goals and criteria. When I served as commander of a recruiting squadron for most of the states of the Upper Midwest, I directed a unit that looks for the best and brightest in this nine-state region.⁴ The uninitiated could hardly fathom the challenges associated with this daunting task. For example, few people understand that 73 percent of youth between the ages of 17 and 24 are ineligible to join the US military.⁵ That is, we cannot even consider almost three out of every four individuals in this group. Further, most of them have no interest in serving in the armed forces. Currently, training programs in recruiting teach that in order to get one recruit to basic military training, we must make contact with 100 individuals.⁶ How is it possible for the Air Force to meet all of its numbers *and* satisfy both internal and external quality metrics yet still not get the people it needs for the

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future? The answer to this question depends upon a confluence of overlapping factors, including requirements, quality, and eligibility, as well as manning, demographics, and propensity.

Requirements

We're all familiar with the saying, "We get what we ask for." A good staff officer quickly learns that everything flows from stated requirements. What is the mission? Whether personnel, logistics, or operations, we have to know what is required before we can satisfy a need. This article will not labor over the extensive processes originating with Headquarters US Air Force, Manpower and Personnel, that drive requirements for recruits, based on extensive compilations of projected vacancies and known training pipelines as stated by functional communities across the service. Suffice it to say that our goals derive from requirements levied through that command structure down to the individual recruiter in strip malls of small towns across America. Ultimately, *we get what we ask for*—at least within budgetary constraints.

Quality

What do we ask for? The answer varies, depending on the functional community. Nevertheless, in the broadest sense, the Air Force asks for the highest quality candidates America has to offer. The Department of Defense (DOD) levies certain quality metrics on all of the services, but the Air Force has had no problem exceeding them.⁷ For over 25 years, more than 98 percent of our recruits have come from candidates with the highest educational credentials (Tier 1); this is no small feat, considering the fact that independent, nonpartisan research has demonstrated that "nearly one-third of all public high school students—and nearly one half of all African Americans, Hispanics and Native Americans—fail to graduate from public high school with their class."⁸

Is simply possessing a high school diploma enough in the Air Force's highly

technical and demanding career fields? It is not. Without exception or waiver, all applicants must also score at least 36 (out of 99) on the Armed Services Vocational Aptitude Battery (ASVAB) test (English only) in order to join. So, does the Air Force bring in thousands of minimally qualified high school graduates with poor ASVAB scores? We do not. "High quality" recruits, those in category levels (quintiles) I, II, and IIIa, have an overall qualifying test score of 50 points or more (top half). Those in category IIIb have a score less than 50 but at least 36. Although the DOD requires that 60 percent of recruits score in the top half of the ASVAB test, the Air Force has far outstripped this goal for decades.⁹ Other branches have not fared as well.¹⁰ Nevertheless, expectations are not uniform within the Air Force. The AFRS charges squadrons with varying high-quality category I–IIIa goals, depending on a market's ability to recruit such applicants. The ASVAB test, however, is more than just an overall qualifying score. It also comprises several other skill-set line scores (e.g., mechanics and electronics, or aptitude areas such as quantitative thinking). It is not surprising, then, to find almost as many qualifying matrices of scores as individual Air Force specialty codes, tracing back to requirements levied by Headquarters Air Force. Again, ultimately, *we get what we ask for*—and Air Force demands are rigorous.

Eligibility

What else constitutes a qualified applicant? Beyond a high school diploma and a good ASVAB score, eligibility requirements range widely. Recruits must satisfy the minimum total quantitative test score of 36, mentioned above, or meet a quality requirement demanding a minimum aptitude score, such as 72 in electronics. They might qualify for an aptitude area with a line score as low as 32 (e.g., administration), but there are few jobs with such standards, and the wait can be long. Physical standards such as body fat index, maximum allowable weight for a given height, color vision, depth percep-

tion, or the ability to lift heavy objects play a role as well. Some of the criteria reflect the physical rigors likely encountered in execution of the mission, such as the ability to swim or run swiftly; others, such as those necessary for intelligence jobs requiring compartmented security clearances, consider such matters as citizenship (native or naturalized), credit history, and violations of the law (e.g., too many speeding tickets). Problems suggesting flaws in character or moral improbity can be disqualifying; these include felonies, any open-law violation (even relatively minor infractions such as excessive parking tickets), drug use, shoplifting, driving under the influence, possession of alcohol as a minor, and other misdemeanors spelled out in excruciating detail in the regulations.

Failure to meet these criteria disqualifies some applicants entirely. Others are eligible for a limited number of jobs—which may not interest them. A few will qualify for all career fields. Nevertheless, rigorous quality checks at every level limit the pool of eligible applicants. It is also important to point out that final eligibility is adjudicated by the impartial, third-party oversight of the United States Military Entrance Processing Command (which owns and administers the ASVAB), a joint organization acting independently of any service influence in nearly every step of the process. Additionally, all applicants must pass rigorous medical

examinations administered by civilian physicians employed by the joint command, not the Air Force. Data collected by the command, going back decades, reveal typical successful processing rates of only 50 percent for all services.¹¹ This quality cross-check ensures that everyone fully adheres to the regulations and that we place only qualified Airmen in the Air Force.

However, do all these stated objectives and quality metrics involving diplomas, testing, and eligibility ensure that the Air Force obtains the people it needs for the future? Not necessarily, due in part to a goaling system driven almost exclusively by stated mission requirements from Headquarters Air Force. This system does not fully consider all aspects of demographics or an individual's propensity for joining the service; neither does it completely incentivize less tangible outcomes such as diversity. Once again, we get what we ask for—no more. For example, when the Air Force tasked the AFRS with an increase of 4,000 new recruits in fiscal year 2009, the command faced two choices: either “pour gas on the fire” or “peanut-butter-spread” the requirements. That is, the AFRS had to choose between working in geographic areas that virtually guaranteed more recruits or evenly distributing the requirements nationwide, holding the recruiting squadrons accountable for their portion of the new goal. The command chose to “pour gas on the fire” by



US Air Force photo

Maj Gen Anthony F. Przybyslawski, vice-commander of Air Education and Training Command and a Chicago native, administered the oath of enlistment to 60 young men and women on 16 August 2008 during the 50th Annual Chicago Air and Water Show.

recruiting in areas that would most easily help it attain the increased goal. Thus, the AFRS added 124 new recruiters in those areas believed most productive for its purposes.¹²

Manning, Demographics, and Propensity

Was such an approach inappropriate? Not at all. The Air Force still received the highest quality recruits in terms of numbers, skills, and timing. It does, however, illustrate the recruiting process writ large. The Air Force bases its recruiting on manning, propensity, and demographics. First, and obviously, we recruit best where a recruiter is present. By way of explanation, many people do not realize that line recruiters volunteer for this temporary special duty away from their career fields. As of this writing, only two active duty Air Force Airmen recruit in the state of South Dakota and its more than 77,000 square miles! Because of their voluntary status, recruiters have the final say about where they work—based on availability. Therefore, many offices remain chronically vacant. Although squadrons assign nearby recruiters to “cover” such empty offices, in truth, those individuals cannot effectively attend to zones located several hours from their home office. Additionally, many of them choose to return to their hometown. Unsurprisingly, a city like sunny San Antonio, Texas, holds more attraction for them than one like Bemidji, Minnesota, which can literally lie fallow for years. A good many will also choose locations close to Air Force installations, where they can avail themselves of the benefits of the base and the instant market of potential recruits who have a higher propensity to join.

Additionally, base realignment and closures continue to transform the Air Force into smaller enclaves with an ever-decreasing footprint. For instance, a circular template with an 800-mile diameter (approximately 500,000 square miles or an eight-hour drive time) having its center on the border intersection of Iowa, Wisconsin, and Minnesota would capture portions of 11 different states but only three active duty Air Force bases:

Offutt (Nebraska), Whiteman (Missouri), and Scott (Illinois).¹³ However, moving this same template south to Altus AFB, Oklahoma, would capture 18 Air Force installations, just as moving it to Robbins AFB near Macon, Georgia, would encompass 15 entirely different bases.¹⁴ Similar comparisons adduce evidence that no major active duty Air Force installations exist in 14 states north of 39 degrees latitude—the southern Kentucky border.¹⁵ Therefore, despite US census data showing that the mean center of population of the United States runs on a line along the Kentucky border, the overwhelming majority of Air Force installations lie below this line.¹⁶ It is easy to deduce that exposure to the Air Force and its way of life is not nearly as accessible to half the population of this country, at least to the same degree as those who live south of Kentucky. This situation produces a special-duty system of volunteers with its consequent chronic shortage of manning in certain locations, in conjunction with recruiters' desire to return home; moreover, the proximity of air bases creates a synergy whereby Air Force recruiters continue to draw heavily from increasingly smaller cultures and communities.

But manning and demographics do not drive the recruiting process in isolation. The propensity of potential applicants to join the Air Force also plays a significant role. For example, the state of Alabama yields almost 10 times as many recruits as South Dakota even though both are roughly the same geographic size and both have about 50 percent of their populations in nonmetropolitan areas.¹⁷ Alabama's larger population (5.8 times that of South Dakota's), in and of itself, does not account for this difference.¹⁸ Specifically, a compilation of DOD recruiting data by the Heritage Foundation revealed propensity ratios of 0.9 and 1.31 for South Dakota and Alabama, respectively.¹⁹ That is, for every 90 recruits from South Dakota who join, 131 from Alabama join, despite similarities in geography and rural densities.

Such propensities are common. In fact, most of the South Central states are over-represented, compared to their Upper Midwest counterparts, with Texas among the highest at a 1.31 propensity and North Dakota among the lowest at 0.53.²⁰ This difference suggests that Texans are 40 percent more likely to join than North Dakotans. Good business principles would advise us to “pour gas on the fire” and increase manning in those areas that include people with higher propensities to join. In fact, in an era of fiscal frugality, the Air Force has practiced good husbandry of its resources and increased the number of recruiters in these fertile locations. Implementing such enterprise solutions ensures that the Air Force gets the numbers it needs, just as upholding recruiting standards ensures that quality remains high.

However, the unintended consequence of increasing goals in areas of higher propensity is that we continue to propagate an Air Force that “speaks with a Southern accent.” Many people see nothing wrong with such a demographic shift; indeed, some of them would even complain of a prejudicial bias for pointing out that it exists. Nevertheless, I do not offer this observation as some Mason-Dixon polemic but as a single illustrative example of the significance of propensity in Air Force recruiting. For good or ill, a process based on manning, demographics, and propensity continues to institutionalize differences between those who join the Air Force and the greater American society we protect.

Possible Consequences of Recruiting Policies, Processes, and Programs

America is not uniform. Cultures and demographics vary widely throughout the nation. Political views abound as well. Nearly every reader is familiar with the concept of “red states” and “blue states,” which is reflected in propensities to join. We also see

differences in recruiting based on such factors as use of alcohol, metropolitan densities, and proficiency in the English language—even tattoos. Indeed, far fewer people are eligible to join today because broad sectors of America celebrate their culture with extensive use of tattoos as body art.

Censuring alcohol consumption by minors also varies greatly among locations. Wisconsin is just as famous for its breweries as its cheese. Is it acceptable to disenfranchise more applicants from Wisconsin than from West Virginia because their subculture makes them 2.5 times more likely to drive while under the influence of alcohol than their West Virginia counterparts?²¹ Many readers would immediately, vehemently, and vociferously argue that such discrimination is entirely appropriate and necessary, demanding only the highest quality candidates for defense of the nation. Perhaps, but the point is that distinct cultural differences exist among populations across the federated states. Those in the Upper Midwest, such as Wisconsin, the Dakotas, Minnesota, and Nebraska, have rates of self-admitted DUIs as high as 26 percent, while states like Arkansas, Kentucky, the Carolinas, and West Virginia are at 10 percent.²² In our quest for recruits, is it appropriate to permanently disenfranchise youths from broad swaths of the nation at more than twice the rate of other areas?

Would anyone be surprised if it were demonstrated that members of densely populated metropolitan areas of the East and West coast “blue states” have substantially lower propensities to join the Air Force than residents of suburbs or rural areas? Urban areas are densely populated but produce only 8 percent of military recruits.²³ By way of illustration, the state of Montana has a population of just under 1 million, averaging only six people per square mile. Rhode Island, also with a population of approximately 1 million, has a much greater density—over 1,000 per square mile.²⁴ Yet, the propensity to join is 1.67 in Montana and .53 in Rhode

Island; that is, more than three times as many Montanans as Rhode Islanders are likely to join the service, despite the states' nearly identical populations. However, this article does not seek to interpret such differences in worldviews among population densities or geographies in the United States; rather, it simply points out the fact that significant differences do exist and are reflected in the people who join an all-volunteer Air Force.

So, are we getting the recruits we need? As stated in the beginning of this article, the Air Force is certainly attracting the right *number* of young people to join. Additionally, Headquarters Air Force is continually identifying the right cognitive and aptitude skill sets required for the future to ensure that we have good quality. And the AFRS has effectively executed its mission faithfully for a decade, sending only the best-qualified recruits to basic military training on time. But what about diversity?

Headquarters assures us that the Air Force has made great strides in assuring a diversified force structure in terms of race and gender, and statistics seem to bear this out. A quick look at the Air Force Personnel Center's Web page proclaims it, and the Office of the Assistant Secretary of Defense for Personnel and Readiness annually confirms such assertions.²⁵ Nevertheless, is it a force structure representative of America? For the most part, it is—if we limit diversity to the traditionally tracked categories. However, Air Force diversity is much broader than simple demographic differences commonly identified by the Equal Employment Opportunity Commission. It also includes “personal life experiences, geographic background, socioeconomic background, cultural knowledge, educational background, work background, language abilities, physical abilities, philosophical/spiritual perspectives, age, race, ethnicity and gender.”²⁶

Diversity for the sake of appearances has limited value in a meritocracy such as the military. Meritocracies select, reward, and promote, based on performance. The

military concerns itself much more with the tangible successes of combat than with vagaries of political representation. Echoing recent comments by the secretary of the Air Force, the underlying principle of diversity is varied backgrounds, experiences, and mind-sets of diverse groups of people to ensure the widest possible range of outcomes.²⁷ As long as we access people who can conform to our military ethos and inculcate our core values of integrity, service before self, and excellence in all we do, we should be casting the net for the most diverse Air Force we can recruit. If we do not, if we recruit only from our own families and communities, if our applicants come only from around air bases, if we continue to contract further and further into the South, if we disenfranchise major sections of the nation due to culture or politics or behaviors, then we run the risk of becoming detached from the rest of society. Worse, we risk the potential of developing an elite, homogeneous culture disconnected from the values and experiences of the larger population base and the elected civilian leadership. Historically, America's founding fathers greatly feared the possibility of the military's developing its own unique subculture, considering it a dangerous path to take. Such a military may begin to question, albeit benignly at first, the direction and decisions of the civilians it has sworn to protect. Although this notion may be jarring to readers raised on Samuel Huntington's long-cherished ideal of the “soldier and the state,” authors such as Peter Feaver have already raised the warning flag about such changes in oversight and civil-military relations.²⁸

All this being said, however, it is not necessary to lower our standards to obtain greater diversity. Potential solutions lie far beyond the scope of this article, but the first step is to acknowledge the problem and then develop the political will to make changes. If we do not, if we continue to go back to the well, if we continue to travel the easy route, how much more disconnected will Air Force culture become from the rest

of society by 2030? I am confident that in that year we will have a highly competent, highly qualified force structure, motivated to serve and excel. However, unless we modify our recruiting policies, processes, and programs to accommodate vast and ongoing cultural and demographic differences, I am not as confident that those forces will reflect the diversity of America. The next step could take the form of better guidance

and vision from our political and senior leaders, which Headquarters Air Force can state in terms of requirements and which the AFRS can translate into the current goaling system. But if we do nothing, then we might not have leaders in 2030 who will vary as much in viewpoints, backgrounds, and cultural experiences as the rest of the nation we swear to protect. ★

Maxwell AFB, Alabama

Notes

1. This number is revised from the original estimate of 31,800. See Brig Gen Alfred J. Stewart, "Recruiting: Crucial to National Defense," Commander's Commentary, Air Force Recruiting Service EXTRA-net, Randolph AFB, TX, 7 September 2008, <https://xtranet.rs.af.mil/pages/?id=87>. For the Air Force Recruiting Service's mission statement, see the Air Force Recruiting Service Mission Brief, Randolph AFB, TX, September 2008, slide 2.

2. Stewart, "Recruiting: Crucial to National Defense."

3. For the purposes of this article, all references to recruiting mean only active duty, non-prior-service enlisted accessions. Different organizations and systems recruit officer trainees, health professionals, people with prior service, and those in the Guard/Reserve, but they are not considered in this article.

4. Lt Col Steve Marsman served as commander, 343d Recruiting Squadron, AFRS, Air Education and Training Command, Offutt AFB, NE, from June 2007 to June 2009. This squadron's recruiting region is an area of responsibility twice the size of Iraq.

5. Their ineligibility stems from a host of disqualifying factors including overweight, moral improbity, violations of the law, medical conditions, dependents, low test scores, and so forth. Another 10 percent will not join because they are in college, and an additional 10 percent (although technically eligible to join) have limited value to the Air Force as low-quality candidates—leaving a total market of 1.4 million or only 5 percent of the youth! See House, *Prepared Statement of the Honorable David S. C. Chu, Under Secretary of Defense (Personnel and Readiness), before the House Armed Services Personnel Subcommittee on "Overview of Recruiting, Retention, and Compensation,"* 110th Cong., 2d sess., 26 February 2008, http://armedservices.house.gov/pdfs/MilPers022608/Chu_Testimony022608.pdf.

6. "Signing an Applicant," Air Force Recruiting Service Mission Brief, slide 10.

7. "Mission Success," Air Force Recruiting Service Mission Brief, slide 7.

8. "Population Representation in the Military Services," Office of the Under Secretary of Defense, Personnel and Readiness, fiscal year 2007, <http://www.defenselink.mil/prhome/PopRep2007/index.html>. In recent years, more than 99 percent of Air Force recruits have earned traditional diplomas. However, this underestimates their quality since most of the remaining fraction represents either typically home-schooled children or those with a difficult-to-earn General Educational Development diploma, who score in the highest Armed Services Vocational Aptitude Battery categories. See also Christopher B. Swanson, *Who Graduates? Who Doesn't? A Statistical Portrait of Public High School Graduation, Class of 2001* (Washington, DC: Urban Institute, 25 February 2004), <http://www.urban.org/publications/410934.html>; and Jay P. Greene and Marcus A. Winters, *Public High School Graduation and College-Readiness Rates: 1991–2002*, Education Working Paper no. 8 (New York: Manhattan Institute for Policy Research, February 2005), 1, http://www.manhattan-institute.org/html/ewp_08.htm.

9. Cited in "Population Representation in the Military Services," table D-9. Service programs are required to ensure that a minimum of 90 percent of non-prior-service recruits graduate from high school with diplomas. At least 60 percent of recruits must be "high-quality," defined as graduates with scores drawn from categories I–IIIA; no more than 4 percent of the recruits can come from category IV. The last time the Air Force fell below 60 percent was in 1982.

10. For the past several years, the US Army has struggled with reaching the benchmark, with a low of 44 percent in the high-quality category in 2007. Cited in "Population Representation in the Military Services," table D-9.

11. These data are actually understated if one considers that failing the ASVAB test (less than 36

points) by students taking it at a high school is not considered a "processor" since the test is not proctored at a Military Entrance Processing Station. From "Population Representation in the Military Services."

12. "FY09 EA Manning Projections," staff meeting, Headquarters Air Force Recruiting Service, 11 February 2009, slide 12. This slide reflects a 95 percent target of 1,260 by the end of September 2009 (start of fiscal year 2010).

13. Due to higher speeds on major expressways and slower speeds on other roads, Grand Forks AFB (ND) technically falls barely within an eight-hour drive time. But Whiteman AFB falls out for the same reason, so the count of three remains consistent.

14. Bases in the Altus AFB area include Altus itself, Tinker (OK), Vance (OK), McConnell (KS), Barksdale (LA), Randolph (TX), Lackland (TX, including Brooks City Center and the Kelley and Medina Annexes), Laughlin (TX), Goodfellow (TX), Dyess (TX), Sheppard (TX), Cannon (NM), Holloman (NM), Kirtland (NM), Schriever (CO), Cheyenne (CO), Peterson (CO), and the United States Air Force Academy (CO). Bases in the Robbins area include Robbins itself, Moody (GA), Patrick (FL), MacDill (FL), Tyndall (FL), Eglin (FL), Hurlburt (FL), Keesler (MS), Columbus (MS), Maxwell (AL, including Gunter Annex), Arnold (TN), Charleston (SC), Shaw (SC), Pope (NC), and Seymour Johnson (NC).

15. The adduced states include Maine, New Hampshire, Vermont, Rhode Island, Connecticut, Pennsylvania, West Virginia, Kentucky, Indiana, Iowa, Michigan, Wisconsin, Minnesota, and Oregon. Derived from the annual demographic database printed in *Airman Magazine*, January 2004.

16. This means that just as many people reside north of this line as south of it, with a geographic terminus near Saint Louis at Steelville, MO. See "Population and Geographic Centers," <http://www.census.gov/population/www/censusdata/files/popctr.pdf>. Inclusion of all branches of the military makes the distinction even more pronounced.

17. The portion of the enlisted goal in 2008 for flights located in Alabama was 640 compared to only 67 in South Dakota. See "Flight Production_EOY," Microsoft Excel spreadsheet, Market and Analysis Branch, AFRS, Randolph AFB, TX, fiscal year 2008, [https://xtranet.rs.af.mil/library/HQ%20AFRS/RSO/RSOA/RSOAM/Flight%](https://xtranet.rs.af.mil/library/HQ%20AFRS/RSO/RSOA/RSOAM/Flight%20). South Dakota has about 25,000 more square miles than does Alabama. See US Census Bureau: State and County QuickFacts (Population Estimates, Census of Population and Housing, Small Area Income and Poverty Estimates, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits, and Consolidated

Federal Funds Report). For definitions of metropolitan areas, see US Census Bureau and Office of Management and Budget. See also US Census Bureau, Census 2000 Redistricting Data (PL 94-171) summary file for state populations, and Cartography: Population Division, <http://www.census.gov/population/www/cen2000/atlas/pdf/censr01-102.pdf>.

18. US Census Bureau: State and County QuickFacts.

19. See map 2, "Enlisted Representation Ratios for 2007," in Shanea Watkins and James Sherk, Report no. 08-05, *Who Serves in the U.S. Military? The Demographics of Enlisted Troops and Officers*, Heritage Foundation, 21 August 2008, <http://www.heritage.org/Research/nationalSecurity/cda08-05.cfm>. Calculations are based on data from the DOD, Defense Manpower Data Center, Non-Prior-Service Accessions, 2007; and Steven Ruggles et al., Integrated Public Use Microdata Series, version 4.0 (Minneapolis: University of Minnesota, Minnesota Population Center, 2008), <http://usa.ipums.org/usa> (accessed 21 July 2008).

20. Watkins, *Who Serves in the U.S. Military?* See map 1, "Military Enlisted Recruit-to-Population Ratios, by Region in 2007."

21. The rate is 26 percent in Wisconsin, compared to 10 percent in West Virginia. See National Survey on Drug Use and Health, 2004-6, Office of Applied Studies, Substance Abuse and Mental Health Services Administration, <http://www.oas.samhsa.gov/nhsda.htm#content>.

22. Ibid.

23. The total is 7.93 percent of applicants with all forms of educational credentials from urban areas. See "Population Representation in the Military Services," table B-42; and FY 2007 Non-Prior-Service NPS Active Duty Enlisted Accessions by Education, Component, and Urbanicity.

24. See US Census Bureau: State and County QuickFacts.

25. "Air Force Demographics," Air Force Personnel Center, 31 March 2009, <http://www.afpc.randolph.af.mil/library/airforcepersonnelstatistics.asp>.

26. "Diversity," *Airman's Roll Call*, 12-18 November 2008, <http://www.af.mil/shared/media/document/AFD-081113-064.pdf>.

27. Hon. Michael B. Donley, secretary of the Air Force, "Diversity," Letter to Airmen, 17 February 2009, <http://www.af.mil/information/viewpoints/secaf.asp?id=449>.

28. Samuel P. Huntington, *The Soldier and the State: The Theory and Politics of Civil-Military Relations* (Cambridge, MA: Belknap Press of Harvard University Press, 1957); and Peter D. Feaver, *Armed Servants: Agency, Oversight, and Civil-Military Relations* (Cambridge, MA: Harvard University Press, 2003).

Modern Air Power and the 1916 Arab Revolt

What Can the Modern Airman Do to Counter Lawrence of Arabia?

Wing Cdr Clive Blount, Royal Air Force*

That most enigmatic and eccentric of Englishmen, T. E. Lawrence, more popularly known as “Lawrence of Arabia,” has risen in the military psyche from obscure young archaeologist to key thinker and writer; indeed, in his day, he was one of the most successful practical leaders of what has become the widespread modern phenomenon of insurgent warfare. His leadership of the uprising by Arab tribes of the Hejaz against their Ottoman overlords has been widely studied by military minds as diverse as Mao Tse-tung and John Boyd.¹

Although his main works—*The Seven Pillars of Wisdom* and *The Mint*—are widely known and oft-quoted, a relatively minor article of his, originally written for the *Army Quarterly* and reprinted in the 1939 volume *Oriental Assembly*, contains a treasure trove of thought on irregular warfare. It is a resource worth revisiting in the light of modern experience.² In addition to Lawrence’s introducing the notions of “eating soup with a knife” and the “kingfisher flash,” his description of the evolution of the Arab revolt, which commenced in June 1916, gives the modern military officer much to ponder when faced with today’s threat. In an effort to stimulate a debate in this journal and in the wider defence community, I discuss Lawrence’s thoughts on

insurgency from the point of view of a modern airman, and, more specifically, I turn around his exposition on irregular warfare in order to examine the possible roles of air power in countering an insurgency governed by principles that he espoused.

After generations of poor treatment by the Ottoman (Turkish) overlords, Grand Sharif Hussein, as the head of the Arab nationalists and ruler of Mecca, entered into an alliance with the United Kingdom and France against the Ottomans in June 1916. Convinced that the Ottoman government was planning to depose him at the end of the war, Hussein began an exchange of letters with Sir Henry McMahon, the British high commissioner in Cairo.³ This correspondence, which has since become highly controversial, convinced Hussein that Arab commitment to the side of the Triple Entente would be rewarded by establishment of an independent Arab empire encompassing a wide swathe of the Middle East, with the exception of British imperial possessions and British interests in Kuwait, Aden, and the Syrian coast.⁴ French and British naval forces had cleared the Red Sea of Ottoman gunboats early in the war, so the maritime flank was secure. The port of Jidda was attacked by 3,500 Arabs on 10 June 1916 with the assistance of seaplanes and naval gunfire support from British warships; the Otto-

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man garrison surrendered five days later. By the end of September 1916, Arab armies, with Royal Navy support, had taken the coastal cities of Rabegh, Yenbo, and Qunfida. The remaining Ottoman forces in the Hejaz numbered some 150,000 well-armed regular troops.

In October 1916, the British Army in Cairo sent Lawrence, a young officer previously employed in cartography and relatively minor intelligence roles, to assist in liaising with Hussein's Arabs. Lawrence spoke Arabic well and had travelled extensively in Arabia as an archaeologist before the war. His initial contribution to the revolt was convincing the Arab leaders (Hussein's sons Ali, Faisal, Abdullah, and Zeid) to coordinate their actions in support of British strategy. He persuaded them not to attack and attempt to drive the Ottomans out of Medina, but devised a strategy whereby the Arabs attacked the Hejaz railway along which the Medina garrison was supplied and reinforced. This tied up far more Ottoman troops, forcing them to protect the railway and repair the constant damage whilst still using up resources defending Medina against harassing attacks.⁵ A plan called for mounting the attacks from ports along the Red Sea, initially from the coastal city of Wajh. On 3 January 1917, Faisal began an advance northward along the Red Sea coast with a force of around 10,000 men and some 1,200 camels; the Royal Navy would resupply him from the sea. However, moving such a large force took time, and the Royal Navy, in the shape of HMS *Hardinge*, arrived first at Wajh on 22 January 1917, commencing an attack the next morning. Wajh surrendered three days later to a small force of British and Arabs landed from HMS *Hardinge*, joined by Faisal's main force within 36 hours.⁶ Following the loss of Wajh, the Ottoman leaders abandoned their intended plan to capture Mecca and consolidated their defensive position in Medina with small detachments scattered along the Hejaz railway. The Arab force deployed in three main groups: Ali's force threatened Medina; Abdullah operated from Wadi Ais,

harassing Ottoman communications and capturing supplies; and Faisal based his force at Wajh. Camel-mounted Arab raiding parties had an effective radius of around 1,000 miles, carrying their own food—which consisted mainly of flour from which they made a simple bread—and taking water from a system of wells approximately 100 miles apart.⁷ Air support proved most effective during the campaign, both in provision of striking power and in resupply.⁸

The Arab revolt tied up some 30,000 Turkish troops along the Hejaz railway, prevented a link-up between the Turkish forces in Arabia and the Germans in east Africa, and, by adopting harassing hit-and-run tactics, gradually weakened the Turkish armies by small-scale attrition. The actual defeat of the Turks, however, was directed by Britain's Gen Sir Edmund Allenby. Nicknamed "the Bull," Allenby launched a successful offensive from Sinai in the autumn of 1917, sweeping up into Palestine to occupy Jerusalem in December 1917. Severe winter weather in 1917–18 and continuing stubborn Turkish resistance delayed his advance, but in the following year, with the Arab irregulars on his right flank, he advanced to eventual victory, taking Damascus on 1 October 1918 and Beirut seven days later. The use of air power in this stage of the campaign was crucial, and *Seven Pillars of Wisdom* makes several references to its use.⁹ Further south in the Ottoman Empire, in Mesopotamia (modern Iraq), the British had overturned early disasters (in 1916, 8,000 Anglo-Indian troops had surrendered to the Turks at Kut) and, under the leadership of Gen Sir Frederick Stanley Maude, had captured Baghdad on 15 March 1917.¹⁰ By the end of 1918, Mesopotamia was in British hands. The war against the Turks came to an end on 30 October 1918 when Turkey signed the Mudros armistice.¹¹ The Arab peoples of the Hejaz and Syria were justly proud of the part they had played to secure Allied victory and looked forward to the Arab homeland promised them by McMahon. However, they were disappointed as the extent of the Anglo-French Sykes-Picot agree-

ment and the ramifications of the Balfour Declaration in support of Zionist aspirations for a Jewish homeland became more widely apparent.¹² The scene was thus set for the genesis of the current problems in the Middle East. In addition to the cause of an Arab Palestine that sits at the centre of modern conflict, the deep-seated resentment based on the perceived betrayal by the British after the revolt provides a motivation for anti-Western sentiment. Osama bin Laden referred to this betrayal in his first public pronouncement after the terrorist attacks of 11 September 2001: "Our nation has tasted humiliation and contempt for more than 80 years."¹³

At the end of the chapter on the Arab revolt in *Oriental Assembly* (also contained in *The Seven Pillars of Wisdom*), Lawrence helpfully sums up his view of insurgent warfare in 50 words: "Granted mobility, security (in the form of denying targets to the enemy), time, and doctrine (the idea to convert every subject to friendliness), victory will rest with the insurgents, for the algebraical factors are in the end decisive, and against them perfections of means and spirit struggle quite in vain."¹⁴

So what does Lawrence mean by these 50 words? I now propose to examine some of these factors in detail, to understand fully Lawrence's thinking before moving on to examine possible ramifications for the use of modern air power in countering such a strategy.

By *mobility*, Lawrence is seeking for his insurgents the ability to move at will across the battlespace in which they operate. He points out that the number of conventional troops required to secure the Hejaz was huge—over 600,000—so the Turks could occupy only certain areas. The success of the insurgency depended on his ability to bypass these points and operate fluidly in the interstitial space. He likens the Turkish Army to "plants, immobile as a whole, firm-rooted, nourished through long stems to the head" whilst the insurgents "were an influence . . . an idea, a thing invulnerable, intangible, without front or back, drifting about like a gas."¹⁵ As his early recommen-

dation not to recapture Medina shows, he has no use for territory; rather, he exploits the enemy's conventional approach of dominating ground to tie up forces and to create a logistical drag on the enemy system. Attacks on Medina continued, but solely to force the enemy to use up ammunition and supplies, heightening the importance of the Hejaz railway, which itself then became another burden for the Turkish Army. Air Commodore Julian Stinton, in his otherwise excellent "Viewpoint" in *Air Power Review*, discusses modern counter-improvised explosive devices (IED) operations as a "critical tactical facet"—which such operations undoubtedly are—but then dismisses the movement of land forces by air as surrendering the ground to the enemy and fixing "us" further.¹⁶ I would take issue with this last point and argue that the reliance on land lines of communications (LOC) and the slow speed of movement on land is becoming our Hejaz railway. As a historical aside, the Turks used many methods, including primitive air power, in a "counter-IED campaign" to keep the Hejaz railway open.¹⁷

I appreciate the fact that current doctrine requires "boots on the ground" to win "hearts and minds" and to provide security for other government department (OGD) and other nongovernmental organisation (NGO) activity, but at what stage do boots on the ground become part of the problem, and when does the activity required to protect such a force, with its inevitable collateral damage, lead to alienation, with "liberators" becoming "invaders"? Recent attacks on North Atlantic Treaty Organisation convoys and bridges in the Khyber Pass region have further illustrated this point—that a land force requires much heavy materiel and that we have no Red Sea maritime flank! Any opportunity to reduce our physical footprint by the use of air power is surely a good idea. In the same edition of *Air Power Review* as Air Commodore Stinton's "Viewpoint," Group Capt Carl Scott clearly articulates the advantages of air over soldiers on the ground in terms of persistence, tactical

surprise, and collateral damage, among other factors.¹⁸

In addition to reducing the reliance on land LOCs, modern air power can seriously hamper the insurgents' ability to "drift about like a gas." The use of striking power from the air is well documented and, indeed, played a successful part in "air policing" operations in the Middle East very early in air power's history. However, for various reasons subject to endless debate, more modern use of air power in asymmetric warfare has been somewhat inconsistent in its contribution to campaign success and has failed to provide "what it says on the tin." Recent advances in technology have enabled rapid, tailored effects with unprecedented accuracy, and, coupling reach and persistence with this increasing technical capability, the utility of striking power from the air is developing apace. However, we need to be much smarter about how we use air power in order to give the commander a far more useful capability against Lawrence's strategy—the ability to know what is going on across the battlespace. The commander can therefore "fix" the insurgents—not in the traditional physical sense of pinning them in space but by dislocating their decision cycle after having destroyed their *mobility* and denied them the opportunity to move undetected and strike at will. Air power then becomes the "gas," particularly against an asymmetric opponent with no air capability, and the enemy becomes increasingly rooted. As Air Commodore Stinton states in his article, the *find* function has become a key role although *understand* may be a more accurate descriptor. According to Lawrence himself, "The corollary of such a rule was perfect 'intelligence', so that we could plan in certainty. The chief agent must be the general's head; and his understanding must be faultless, leaving no room for chance."¹⁹

So what does Lawrence mean by *security*? He states that "rebellion must have an unassailable base, something guarded not merely from attack, but from the fear of it."²⁰ Lawrence used the Red Sea ports as a

start point and relied on the Royal Navy's dominance of the area to secure his base. The Arab revolt is one of several examples in modern history. In the early stages of the Vietnam War, North Vietnamese forces used bases and supply routes in neutral Cambodia and Laos to support the insurgency by the Vietcong in the South. This forced the United States into the first of several difficult moral dilemmas that it had to face during the conflict—to maintain international legitimacy and the moral high ground or to interdict targets in neutral territory. Currently, our opponents in Afghanistan clearly rely on their influence in the northwest tribal areas of Pakistan as a neutral secure base.²¹ Any damage to international relations with the (unwilling?) host nation is a "win" for the insurgent who can add more allies to his cause.

How can modern air power be used to attack the insurgent's security? Well, again, it comes down to the "find" function. The domination of the high plateau of air and, indeed, space enables the construction of complete situational awareness. Traditional properties of air power—technological capability, ubiquity, and reach—must be increasingly supplemented by persistence and backed up with vastly enhanced processing and analysis to ensure that the enemy cannot "hide," enabling us both to strike whenever we want and to use the most appropriate strike assets. Perhaps more importantly, it also gives us the option to strike only *if* we want to: reliable situational awareness may mean that our cause may be better served by *not* striking, thus preserving intelligence sources, keeping the "known" enemy guessing, and reducing the risk of collateral damage, which could hand the enemy a propaganda coup. A neutral base is useless to insurgents if they can be targeted the instant they leave its protection. The psychological effect of attack from the air is also significant. Group Captain Scott quotes an insurgent speaking to the *New York Times*: "We pray to Allah that we have American soldiers to kill . . . these bombs from the sky we cannot fight."²² The psychological

effect is more than a security issue; it also reaches doctrine.

When Lawrence talks of *doctrine*, he clearly means ideas—to unify and motivate his force, and to motivate the support of the population at large. Lawrence asserts that a rebellion can be successful with only 2 percent of the population active in a striking force as long as the remaining 98 percent is passively sympathetic.²³ He goes on to state that “We had [not] won a province [until] we had taught the civilians in it to die for our ideal of freedom: the presence or absence of the enemy was a secondary matter.”²⁴

The battle for the hearts and minds of the indigenous population is a well-understood and permanent fundamental of Western counter-insurgency doctrine, but the methods of winning this battle are many and varied. I have argued the strengths of air power to provide a “hands off” capability and reduce the footprint of the “foreign soldier,” adding to campaign legitimacy and popular support. The presence of foreign troops hands a potential propaganda victory to the insurgent: “How can this government be legitimate if it relies on the infidel?” We must also not dismiss the moral effect. Strike from the air is difficult for the insurgent to counter and thus badly affects morale—particularly if the strike is unexpected and in an area thought safe. John Boyd, creator of the observe, orient, decide, act (OODA) loop, clearly indicated that the aim was to create “moral conflict”—“to increase menace, uncertainty and mistrust in the mind of the enemy whilst increasing initiative, adaptability and harmony within friendly forces.”²⁵ Indeed, he quoted Lawrence as stating that the commander must “arrange the mind” of the enemy.²⁶ It is in this area that the primacy of emerging information operations becomes apparent. Thomas Hammes suggests that his fourth-generation warfare takes place tactically in a low intensity conflict but that at the operational level, “all an opponent has to move is ideas.”²⁷ Again, Lawrence was a trendsetter: “The printing press is the greatest weapon in the armoury of the modern commander.”²⁸

An enigmatic character, T. E. Lawrence was the subject of much controversy in his lifetime. On return from the war and having been dismayed by the British and French attitude towards Arab independence during the Paris peace talks, he eventually shunned publicity and in 1922 enlisted in the ranks of the Royal Air Force (RAF) as Aircraftman John Ross. Soon discovered and forced to leave the RAF, he enlisted as a private in the Royal Tank Regiment. After two years’ service, friends in the prime minister’s office enabled a transfer back to the RAF, and Lawrence was posted as an airman to RAF Cranwell. He retired from the RAF in February 1935 and died only two months later in a motorcycle accident near his home in Dorset.²⁹ Basil Liddell Hart argued that “Military History cannot dismiss him as merely a leader of irregulars; he is . . . a strategist of genius who had the vision to anticipate the guerrilla trend of civilised warfare that arises from the growing dependence of nations on industrial resources.”³⁰

Conventional employment of a modern expeditionary force has proved an expensive and controversial means of countering modern insurgencies and historically has had, at best, mixed success. The “traditional” use of air power as a panacea to an unconventional threat has also proved problematic and of limited effectiveness. By examining the concepts espoused by T. E. Lawrence for the conduct of irregular warfare and by careful consideration of historical campaigns, I propose that imaginative application of modern air power—in particular, air power as a provider of the “find” and, where possible, “understand” functions—holds the key to countering future insurgencies. As airmen we must be bold, both in pushing the boundaries of new air capabilities and in thinking more radically than we have ever done in the past about our way of doing business. We must also seek to truly understand the motivation and mindset of potential adversaries so that, if we need to, we can fight on our terms and at our pace. John Nagl quotes former US secretary of defence

Donald Rumsfeld, referring to the “charge” of US special forces cavalry at Mazar-i-Sharif in November 2001: “The Lesson . . . is not that the US Army should start stockpiling saddles. Rather it is that preparing for the future will require new ways of thinking, and the development of forces and abilities that can adapt quickly to new challenges and unexpected circumstances.”³¹

The fundamental air power properties of flexibility, reach, ubiquity, and speed of response, combined with the development of a persistent presence in-theatre and mini-

mal tactical footprint, will allow air power to play a much greater role in denying an insurgent enemy the requirements stated in Lawrence’s “50 words” without providing the target set, political problems, and risk of casualties that the “boots on the ground” of a conventional joint force may attract. It is my view that with an innovative approach, air power is on the verge of delivering what we airmen have always promised. ★

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Notes

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KC-X

The Game Changer for Mobility

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The nation's airlift forces have been in high demand since the Gulf War of 1991. The tempo of operations has increased even more as the nation responded to a wide variety of military campaigns and contingencies—from Afghanistan to Iraq to numerous disaster-relief and humanitarian crises. The fact that one Air Force tanker or transport aircraft takes off or lands every 90 seconds gives us some idea of the pace of air-mobility operations.¹

The nation's 172 C-17s represent the backbone of its air-mobility fleet, which enables global response. These aircraft have proven fundamental to US engagement, from deploying forces immediately after the terrorist attacks of 11 September 2001 to delivering relief aid after the earthquake in Pakistan and tsunami in Indonesia. The C-17 is well suited to this role, carrying 18 pallets of cargo—more than 170,000 pounds of material or 102 soldiers—up to 2,400 miles without refueling.²

The extraordinary performance of the C-17 comes with a cost. The Air Force planned for each aircraft to have a 30-year life span, flying 1,000 hours per year. The pace of current operations, however, requires these aircraft to log 1,500 to 1,800 hours a year, prompting Gen Arthur Lichte, commander of Air Mobility Command, to observe that “we know we’re going so fast that . . . instead of a 30-year life, [the C-17] is only going to [have] a 25-year life, or 22.”³

The rate of operations has serious implications for the nation and the Air Force's ability to provide an assured aerial response

worldwide. By flying more hours per year, the Air Force will have to recapitalize the airlift force sooner than planned. Given the number of critical programs currently in the service's acquisition cue—tanker, combat rescue, space awareness, F-35, and bomber—adding airlift aircraft to the list sooner than expected will strain acquisition and operations/maintenance funds even more. The Congressional Budget Office forecasts that the existing Department of Defense (DOD) budget is \$300 billion short (see figure) over the Future Years Defense Plan as the services attempt to recapitalize following extended combat operations in the Middle East.⁴ Defense analyst Loren Thompson declares that “the Air Force's future mobility assets are unlikely to be adequate to satisfy the needs of the joint force for airlift.”⁵

Two options for overcoming this dilemma have emerged. First, according to General Lichte, “If we want to slow down the use of the airplanes . . . we’d think about putting them in the Guard and Reserve.” C-17s in the Reserve forces would fly fewer hours each year because those units do not operate at the same tempo as active duty squadrons.⁶

Alternatively, the Air Force could purchase more of these airlifters. Since the current fleet of 172 C-17s is flying at least one-third more hours than planned, increasing the size of the fleet by about one-third (to at least 231 aircraft) would balance the workload.⁷ The planned C-17 program will provide the Air Force with a total of 205 C-17s,

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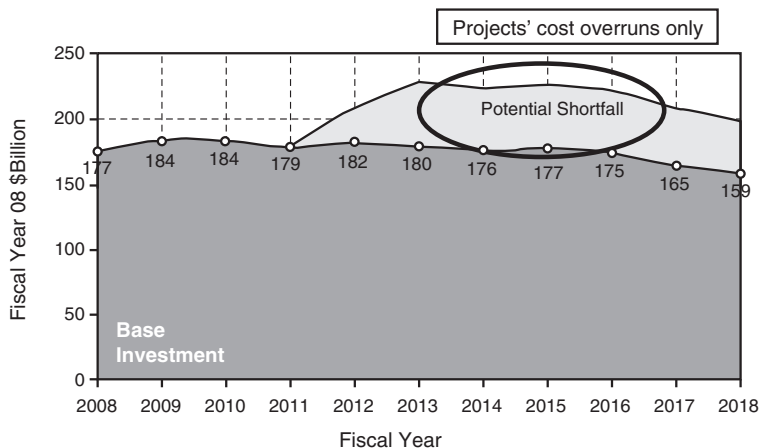


Figure. Potential DOD \$300 billion shortfall to fully fund recapitalization. (From Hugh Brady, “Macroeconomic and Defense Topline Forecast: 44th Annual GEIA Federal Forecast” [presentation at the Government Electronics and Information Technology Association 2008 Vision Conference, Washington, DC, 16–17 October 2008].)

so the service needs at least 26 more. Costing \$250 million per aircraft, the additional C-17s would require another \$6.5 billion in Air Force spending.

Is there another option other than flying less or buying more? Indeed, the Air Force's next-generation aerial-refueling tanker—the KC-X—offers an opportunity to reduce the C-17's workload. Historically, the Air Force has used tanker aircraft almost exclusively for aerial-refueling operations. Some individuals in the air-refueling business suggest that tankers offer little promise as airlifters, citing the fact that, for various reasons, tankers have carried less than 1 percent of the cargo transported.⁸ Specifically, the Cochran loader, the mainstay for loading/off-loading a KC-10, was not available worldwide in large numbers, and, if deployed to dispersed airfields, it required several hours to reassemble. Furthermore, the KC-135's floors could support only six very light-weight cargo pallets. In addition, the 25,000- or 40,000-pound loaders needed for the KC-135 were not widely available. These factors combined to reduce opportunities for using tankers in a transport mode.

US military doctrine, however, calls for “all USAF tanker aircraft . . . to augment

core airlift assets.”⁹ For example, while redeploying forces after Operation Desert Storm in 1991, KC-10 and KC-135 aircraft conducted more than 2,800 airlift sorties in addition to air-refueling missions.¹⁰ To improve the tanker's potential even further, the Air Force has fielded the Halvorsen and Tunner cargo loaders, thereby making it easier to support the entire mobility fleet, including air-refueling aircraft that carry cargo. Thus, the service recognizes the need to draw upon tanker aircraft to provide a wider range of capability. Indeed, as a means of attaining seamless integration with the entire defense transportation network, the KC-X is expected to accommodate the Halvorsen and Tunner loaders that will load or off-load its pallets.

Air Force leaders are searching along these lines for innovative approaches to reduce the high demands on the C-17 fleet. Gen Norton Schwartz, chief of staff of the Air Force, identified the KC-X as an aircraft that will and must break through barriers between the traditional airlift and air-refueling missions: “I am looking for versatility; single-mission aircraft don't give that.”¹¹

Recognizing this expectation, the prime contenders for the Air Force's next-generation

tanker offered improved airlift capacity as part of their proposals. Boeing's KC-767 Advanced Tanker transports 190 passengers and 19 pallets of bulk cargo while Northrop Grumman's KC-45 delivers 226 passengers and 32 pallets. Compared to the KC-135's capacity of about 50 people and just six pallets, the new tankers' accommodations offer dramatic improvement for future airlift operations.

Capitalizing on the KC-X's capability requires more than just new aircraft—air-mobility operations must embrace a fresh mind-set to exploit the increased capacity, no matter which aircraft the Air Force selects. Air Force leaders seek to instill a new culture within Air Mobility Command—a culture that eliminates concepts of “tanker” or “transport” aircraft and adopts “mobility” aircraft that offer the war fighter versatility, flexibility, and reduced costs for mission accomplishment. The KC-10 inspired this thought process but does not exist in sufficient numbers to drive the change.

The next-generation tanker promises to further break down barriers between the airlift and air-refueling communities and reinforce the mobility mind-set. Military officials can draw upon the KC-X's airlift capacity and task it solely to transport passengers, cargo, or both, as mission requirements dictate. Although designed for over- and outsized cargo, currently the C-17 carries bulk loads on over 50 percent of its missions—those that the KC-X will be well suited to perform.¹² As a commercial derivative, KC-X aircraft will build on the airline industry's standard for cargo doors and floors, making them readily adaptable to transport cargo. The new aircraft will fit easily into the defense transportation system, improving the speed and accuracy with which US Transportation Command delivers services and products around the world. Much like the C-17, the KC-X will have defensive systems that allow for direct delivery to combat theaters and will not require cross-loading of materials at intermediate locations. As a result, the KC-X should fulfill what some have said is the ability to do “air refueling by night and airlift/aeromedical evacuation by day.”

This value becomes apparent in a number of scenarios when one views the KC-X as a mobility platform. For example, at present the Air Force would have to use 60 C-17s to transport a combat brigade of 3,000 soldiers and 540 pallets of bulk cargo from the United States to Iraq. In contrast, the KC-767 could perform the task with 45 aircraft, and the KC-45 would require just 30—half the number of C-17 sorties.

Much like today's tankers, the KC-X will carry out dual-role taskings, performing both air-refueling and airlift functions on the same mission. This profile applies during the deployment of fighter aircraft overseas, allowing the aircraft and their support equipment to arrive simultaneously. The deployment of squadrons to the Middle East as part of the nation's response to an unanticipated crisis illustrates one measure of the efficiency of dual-role tanker-transport aircraft. Specifically, the Air Force currently would need 72 KC-135s and 18 C-17s—a total of 90 mobility aircraft—to deploy a typical fighter squadron.¹³ However, using the KC-45 in a multimission mode reduces the numbers to only 29 tanker sorties and 10 KC-45 mobility sorties—less than half the number of aircraft and one-third less fuel. The KC-767 would require fewer sorties as well: 36 tanker and 17 transport.¹⁴

Finally, when the Air Force supports the joint force during theater operations overseas, the versatility of the KC-X will offer innovative solutions, performing tanker and transport tasks in a single crew-duty day. Currently, the KC-135 flies from a rear base to refuel aircraft over Iraq or Afghanistan and then returns to its base empty. At the same time, C-17 or C-130 aircraft launch from the rear area to move cargo, passengers, and medical-evacuation patients forward and back in-theater. Outfitted with a self-defense suite, a KC-X aircraft could perform its air-refueling mission and then land at a forward base to pick up cargo, passengers, or patients before returning to the rear area. Thus, one KC-X could do what currently requires a dedicated tanker and dedicated transport aircraft.

The KC-X offers an additional benefit. International partners Japan and Italy have purchased the KC-767, while Britain, Australia, Saudi Arabia, and the United Arab Emirates have bought the KC-45. This situation suggests that, in addition to supplementing coalition air-refueling missions, the KC-X could more easily enhance coalition airlift operations. For instance, at the time, the C-17 was the only aircraft available to move Georgian troops from Iraq back to Tbilisi, but in the future, additional nations could assist as well by contributing assets with identical platforms that are well known and integrated into the US transportation network. Anticipating such new concept-of-operations modes for the KC-X, Gen Duncan McNabb, commander of US Transportation Command, predicted that the “KC-X will do for the tanker force what the C-17 did for the airlift force”—that is, break through mental barriers that limit its full employment.¹⁵

Capitalizing on the KC-X aircraft’s versatility will change the game in terms of how the nation’s air-mobility forces are employed. Embracing such changes will require alterations in the KC-X’s operational organizations, possibly including adjustments to the squadron’s composition regarding personnel, training, and associated enabling elements. As the Air Force moves in this direction, it will see a blurring of the division between “tanker” and “transport” forces in a beneficial, meaningful manner that allows the service to employ its forces in a more tailored, flexible, agile, and intelligent way, and to operate them more cost efficiently.

The Air Force will realize savings in two ways: cost per hour and total operation cost

(or depreciation). Designed for carrying oversized cargo and landing on dirt strips, C-17s operate at a relatively high cost per hour—\$21,800—while the KC-45 and KC-767 do so at less than half that amount.¹⁶ Moreover, to these figures one must add aircraft depreciation costs, normally calculated by dividing the aircraft-procurement cost by the total number of hours to be flown. Thus, the C-17 depreciates at the rate of \$8,300 per hour while the KC-45, based on the commercial A330 (designed to fly for 100,000 hours), does so at \$1,500 per hour, and the KC-767 (designed to fly for 50,000 hours) at \$3,000. So total operating costs come to \$30,100 per hour for the C-17, \$12,500 for the KC-767, and \$11,000 for the KC-45 (see table for summary of savings realized by augmenting the C-17 fleet with the KC-X).¹⁷ Clearly, either KC-X alternative will lower the Air Force’s operating costs.

Given the reality that the C-17 inventory is flying more than anticipated and that the KC-X will have exceptional potential to reduce the workload on the Globemaster, the time is right to embrace innovative concepts of operation and a fresh culture. Air Mobility Command seeks to operate this way today, but it does not have all the necessary resources. Integrating the KC-X as a mobility platform will permit more efficient use of C-17 and C-5 aircraft for outsized cargo. Options exist beyond the traditional programmatic approaches of redistributing the C-17 force between active duty and Reserve units or buying more C-17s. In an era when defense dollars need to deliver the most value, the Air Force needs the versatile KC-X now since it offers the service the

Table. Cost per hour per cargo pallet

	<i>C-17</i>	<i>KC-767</i>	<i>KC-45</i>
Operations and sustainment	\$21,800	\$9,500	\$9,500
Depreciation	\$8,300	\$3,000	\$1,500
Total	\$30,100	\$12,500	\$11,000
Number of pallets	18	19	32
Cost per hour per pallet	\$1,672	\$658	\$344

opportunity to operate faster, with greater flexibility and reduced costs, enabling the existing force to carry out its mission more safely and securely. The Air Force can enjoy these benefits, however, only by seeking alternatives and solutions outside the previ-

ous paradigms and by embracing a new culture. As a result, the service will field a true air-mobility force—and will assure the nation of a global response when and where it needs it. ★

Arlington, Virginia

Notes

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11. *Ibid.*

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Efficiently Exploiting the Power of C4ISR by Optimally Organizing and Training the Producers of Combat Support Effects*

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In a previous *Air and Space Power Journal* article, I argued for the existence of two distinct portions of the find/fix/track/target/engage/assess (F2T2EA) kill chain.¹ The targeting and engaging portions of the chain are the responsibility of *combat* assets specializing in the full spectrum of enemy-asset negation (denying, disrupting, deceiving, degrading, or destroying them, as appropriate). Although some combat assets can independently carry out the remaining portions of the kill chain, they typically are assisted by specialized *combat support* assets that provide the necessary intelligence, surveillance, and reconnaissance (ISR) wherewithal to get them into position to target and engage.

In my earlier article, I concluded that major commands (MAJCOM) should be organized by effect and that one of the most effective organizational restructurings would involve the consolidation of all air and space command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) assets under one commander. The discussion in that ar-

ticle was primarily theoretical, addressing why such a structure would prove more effective than the current one. The present article switches gears and deals with the practical organize-and-train aspects of that consolidation. Although incorporation of National Reconnaissance Office satellites under the same commander would be optimal, the previous article showed that political considerations would likely make that goal difficult to meet. Thus, this discussion concentrates solely on the reorganizing and training of organic Air Force units.

What would an effects-based Air Force C4ISR Command (AFC4ISRC) look like in practice? It would likely start by consolidating all of the existing Air Force ISR Agency (AFISRA) with almost all of Air Force Space Command (AFSPC), whose structure is currently in flux following the Corona meeting of October 2008.² Formerly, AFSPC primarily consisted of two numbered air forces and an in-house acquisitions arm. Following Corona, the numbered air force in charge of intercontinental ballistic missiles (ICBM) will move under the new, nuclear-focused

*Editor's note: This article is a direct follow-on to the author's previous *Air and Space Power Journal* article entitled "Emphasizing Effect over Domain: Merging Three Organizations to Enhance the Efficacy of Our Nation's Intelligence Production" (Spring 2009, <http://www.airpower.au.af.mil/airchronicles/apj/apj09/spr09/tomme.html>). Dr. Tomme adapted the present article from his longer monograph *Expansion or Marginalization: How Effects-Based Organization Could Determine the Future of Air Force Space Command*, Research Paper 2008-1 (Maxwell AFB, AL: Air Force Research Institute, July 2008), http://www.au.af.mil/au/aupress/ARI_Papers/Tomme%20AFRI%20Paper%202008-1.pdf.

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Global Strike Command while the units and missions originally slated to go to a separate Cyber Command (AFCYBER) will now become the Twenty-fourth Air Force under AFSPC. These two developments are definitely steps in the direction of effects-based organization. The longer version of this article (see “editor’s note”) proposed both of them, though for different reasons than the ones that apparently spurred the reorganization at Corona. The key to organizing the new command entails explicitly identifying its function as support. Seen in this light, AFSPC’s absorption of the AFISRA or vice versa is irrelevant as long as the effects producers end up in the right relative positions in AFC4ISRC.

Combat Support Is the Mission

The questions thus become, what are the right relative positions, and what portions of the two organizations should actually join? To answer those questions, we would find it instructive to look at how one of our sister services describes its own organization. The Army classifies its units under three different functional labels: *combat arms*, *combat support*, and *combat service support*, defining the terms as follows:

Combat arms are units and soldiers who close with and destroy enemy forces or provide firepower and destructive capabilities on the battlefield. . . . [Examples of these kinds of units include infantry, armor, and artillery.]

Combat support encompasses critical combat functions provided by units and soldiers, in conjunction with combat arms units and soldiers, to secure victory. . . . [Examples of these kinds of units include military police and military intelligence.]

The primary role of Army tactical [*combat service support*] units is to sustain Army forces. . . . [Examples of these kinds of units include finance, supply, and transportation.]³

The remainder of this article uses the term *warriors* to describe troops whose functions are similar to those of the Army’s combat arms units.

Although this article is not a call for branching troops like the Army does, if the Air Force classified its units in a similar manner, the new AFC4ISRC clearly would fall under the heading of combat support. It would neither contribute to sustaining troops nor fire shots in anger. Rather, the command would exist to support the warriors in the field. This distinction is critical because it is the warrior who establishes requirements, and it is the support troop’s function to respond to those requirements.

The proposed AFC4ISRC structure is inherently oriented toward combat support. AFSPC, however, has operated for 25 years with a split personality. A large portion of its tasks relates to combat support, but a significant minority of its functions is distinctly combat arms. Until recently, the ICBM force represented the most obvious of these functions. The October 2008 Corona action removed those combat arms forces from the core of what is essentially a combat support command. Presumably, the space-and-missiles assignment specialty code that currently joins these two distinct career specialties will separate again to allow better tracking of actual capability and experience: combat versus support.

Likewise, only a relatively small number of AFSPC personnel plan for actual space-on-space combat. These specialists in offensive and defensive counterspace are also, without a doubt, combat arms troops—warriors who do not belong in a support command. They are more logically grouped with Air Combat Command (ACC), the effects-based command that specializes in actually putting weapons on target. Under that new mantle, they would work with their brothers in arms to develop coordinated tactics to deal out destruction in even more effective ways. Removing them from the mix, were AFSPC and the AFISRA joined, would allow the newly formed AFC4ISRC to concentrate on becoming the premier supplier of C4ISR effects, a support function, to warriors across the Department of Defense and the intelligence community.

Similarly, a number of systems—including the U-2, RC-135, and all unarmed, unmanned aircraft systems—that currently reside within ACC performing purely support missions could much better serve the nation as part of AFC4ISRC. Already tasked with providing C4ISR support to the war fighter, these systems are assigned to a command whose mission is weapons delivery. Moving them to a command designed for the delivery of C4ISR effects would allow them to garner the budgetary attention they need; it would also permit single-commander oversight of the integration of the data they provide into a single, integrated database from which users could pull an overall picture of the battlespace appropriate to their needs.

The split-out of combat / combat support functions in the cyber world is a bit more on the gray side, the difference in many cases being the intent of the actions taken by cyber personnel. Cyber warriors may probe enemy defenses one day in a combat support function and then put on their combat hats the next day to conduct an actual attack. Some information operations functions are clearly combat related and belong in a combat command: computer network attack (CNA), computer network defense (CND), and computer network exploitation (CNE). Although one could argue that CNE is a combat support function, separating it from CNA/CND, in this case, would prove difficult because in some instances the same resources could be used to support all three activities. More frequently, we use other information operations functions such as electronic warfare, operations security, and psychological operations to influence enemy actions rather than deny them the use of their assets.

We don't have all airborne assets in the same command. Rather, we organize them according to the effect they provide. We should similarly apportion space assets according to effect. Such a structure runs counter to some recommendations in the Space Commission report that called for a near-complete segregation of space assets and personnel from the remainder of the

Air Force.⁴ Conversely, that structure is quite compatible with the report's overall emphasis on developing space capabilities. The Air Force has recently become aware of some of the flaws in segregating space activities and is in the process of reintegrating them with the rest of the service. After having set up a high-profile operations directorate office for space on the Air Staff as a direct response to the Space Commission report, the Air Force recently closed that office and reassigned its space experts within the staff to facilitate better understanding of space throughout the organization.⁵

The new AFC4ISRC should have as its goal the production of a single, integrated picture of the battlespace, from the mud to the stars. One effect in particular should define the command's core competency: populating the battlespace with information and enabling timely command and control through robust communications channels that allow the picture to be used. Moreover, AFC4ISRC should make total consciousness its overarching goal. Warriors don't care where their information comes from. If they have target imagery when they need it, if they can talk when they want to, then they're happy and effective. They do not care whether their images come from a satellite or an unmanned aircraft system, whether they communicate via satellite link or fiber-optic cable, as long as credible and correct information arrives when they need it.

Gen Kevin Chilton, former AFSPC commander, has noted that one of the best counters to recent antisatellite tests is to acquire redundant C4ISR capabilities, both in space and in the air.⁶ Lt Gen David Dep-tula, the Air Force deputy chief of staff for ISR, is adamant that "all the services buy systems that can feed common distribution pipes."⁷ It is apparent that both of them seek to provide a seamless, transparent view of the battlespace to all users who need it. The most effective way to ensure that such an omniscient, deliverable picture exists would involve placing all the means of producing the picture, all the personnel

required to process and distribute it, and all the means of acquisition and delivery under a single commander who can assure that the disparate data streams play well together. General Deptula's vision for the AFISRA is proceeding along those lines. It won't take an extraordinary organizational leap to finish the job by merging AFSPC and the AFISRA.

The Training of Combat Support Troops

No doubt, some people will resent being told they are not combat troops. The problem is not that we're now telling them they're *not* warriors; it began long ago when, in an attempt at inclusiveness, we began telling all Airmen they *were* warriors instead of leading them to *act like* warriors, to have a sense of urgency and a feeling of deep camaraderie, regardless of their actual function within the service. To cite an obvious example of the dilution of the word *warrior*, phrases like "trigger pullers"—the F2T2EA link is obvious—have entered the service's lexicon precisely to distinguish those who actually deliver combat effects from the rest of the Air Force's "warriors." Regardless of what we are called, each of us must understand what we do, what the importance of our job is, and where we actually fit in a structure designed to prevent and, when necessary, prosecute wars.

There is no shame in being a combat support or combat service support troop. As is evident in military organizations throughout history, the number of people who support frontline warriors far exceeds the number of warriors themselves. It is still possible to have the "warrior attitude" without actually being a warrior, and it is highly desirable to cultivate exactly such an attitude. Failure to *appropriately* cultivate that attitude creates problems, though. When people are told they are warriors long enough in an attempt to cultivate this attitude, many of them begin to believe that they are actually warriors instead of support troops with the

warrior attitude. They can easily lose sight of the mission of supporting warriors and responding to warrior needs. When support troops begin to believe that they set requirements instead of respond to them, then the tail attempts to wag the dog. The US Army's explicit division of functions into combat arms, combat support, and combat service support offers a much better way of delineating these differences than the current Air Force mind-set, which labels everyone a warrior. To generate a sense of pride and place in the conflict, the US Army focuses soldiers on their important role in fulfilling the mission.

Changing the way we develop combat support troops will help clarify these differences by properly identifying the dog and the tail; it will also allow much more effective delivery of support effects such as C4ISR. It's especially important for these troops to understand how the war is fought. We must avoid stovepiping by effectively cross-flowing officers between the different commands, thus ensuring that our combat troops spend time in the support fields so they understand their pain. Simultaneously, we must see to it that Airmen in the combat support specialties experience at least one tour of duty in a warrior command, actually taking part in combat-related activities, if possible. Such is not the currently preferred method.

The Space Commission report did not help on this front either. Its dictum to create a professional space cadre has been interpreted in such a way as to develop members of an even more insular corps who, in their quest for the ultimate technical competence, can spend an entire career shuttling between Colorado Springs, Colorado; Southern California; and perhaps Albuquerque, New Mexico, or Washington, DC.⁸ Though certainly a good way to create a professional with extreme competence in the craft of space and inculcated with the technical culture of space, such a career does a disservice to the nation by minimizing that person's ability to understand and contribute fully to the larger function of national

defense. Only a very few AFSPC personnel below the grade of colonel ever get out to see the world and the people whom their space careers are designed to support—the very warriors who train in that world and sometimes die. As recently noted by one retired naval flag officer with extensive experience in the National Reconnaissance Office, “Only the Air Force defines space ‘operations’ as hands-on satellite command and control by uniformed personnel. The benefit of this ‘operational’ experience is questionable.”⁹

Senior Air Force space officers are close to recognizing and admitting to this problem. In a recent interview, Maj Gen Roger Burg, then the deputy director of operations for space on the Air Staff, discussed how “having a [separate] space office [in the Pentagon] meant that airmen coming from other backgrounds to the Air Staff did not have to learn about space because the questions did not cross their desks.”¹⁰ A corollary of that statement with perhaps broader implication is that Airmen coming from space backgrounds do not have to learn about issues critical to the warriors they support because those questions did not cross *their* desks. “The Air Staff needs to be integrated,” Burg said in that interview.¹¹ But it is not only the Air Staff that needs integration. An essential part of the development of a truly useful space officer requires integration with, or at least intensive personal exposure to, combat arms units.

Unfortunately, integration is not a major focus of the current space-training mindset. Following the Space Commission’s recommendations, AFSPC would like nothing more than to take in young second lieutenants, provide them the appropriate training to work on the operations floor of a satellite squadron, and keep them in space-related billets within Fourteenth Air Force and the Space and Missiles Systems Center until a leader eventually rises to command AFSPC. The command is very proud of the fact that its officers deploy to theaters along with the rest of the Air Force.¹² However, many of them deploy to rear areas where they only

see how a combined air operations center (CAOC) works—not the end user’s needs for C4ISR support. A few months of casual exposure to CAOC-level combat operations offer a start, but not really the correct prescription to cure what ails the command.

The US Army has a better model, typically drawing its space operations officers from a pool of captains with seven to 10 years’ experience in a primary branch. Although not required by written policy, most Army space officers have experience in combat arms units along with command and staff experience.¹³ Thus, they have a much bigger picture about why they provide their space support than do representative Air Force officers who were intentionally isolated in the space career field. Typically, they do not have their Air Force counterparts’ depth of knowledge in the day-to-day operation of satellites, but that is not generally their function. They exist to ensure that their bosses have an expert in their organizations who can advise them on what space can provide. It is their experience with space that makes them so useful to their units. It is their previous knowledge of combat operations that allows them to understand the true utility of their space experience.

The Air Force does have a much greater requirement for hands-on satellite operations. Admittedly, using the first one-third to one-half of officers’ careers to gain operational experience in the field with the warriors they will eventually support is probably excessive for Air Force needs. However, early in their careers, those young space professionals could profitably spend at least one tour down in the weeds with the operators they are destined to support. Their experience with warriors would make them even more valuable to their space units. Gen Lance Lord, former AFSPC commander, recognized the need for career broadening much earlier, noting that “the expeditionary nature of our service must extend to include all space professionals if we are to fully embrace and comprehend the complexities of joint warfare.”¹⁴ Given the predominance of single-seat weapon systems

in the frontline combat arms role of the Air Force, which directly exposes only the pilot to tracking and engaging functions, more than likely a joint tour with the Army as an intelligence officer would offer the best way to obtain this kind of experience.

In addition to space officers, the proposed AFC4ISRC structure would include most of our intelligence troops. Unlike the development of space officers, the Air Force frequently assigns intelligence officers to frontline units early in their careers. In general, their career flow already exposes them to combat troops, letting them see the operations tempo and types of C4ISR support important to those forces.

The above discussion of how to develop a warrior attitude among space professionals harks back to the thoughts of many space force visionaries. One of the persistent themes of their writings, as well as one of the major themes of the Space Commission report, deals with the need for developing just such a warrior culture. Frequently drawing an analogy with the development of a unique air-warrior culture in the early years of the Army Air Corps, some writers implicitly or explicitly extrapolate the similar development of a unique space-warrior culture.¹⁵ However, that analogy does not truly apply since it implicitly assumes conditions that do not actually exist.

Development of the air-warrior culture directly resulted from the shared threat of death or injury at the hands of the enemy. That condition does not exist among space professionals at a rate much greater than the one characteristic of the American population as a whole. By and large, space professionals inhabit a shift-work office environment where military members are surrounded and frequently outnumbered by contractor support. The *esprit de corps* required for the development of a warrior culture does not flourish in such an environment, at least not the kind of camaraderie experienced by warriors bound by the common experience of mortal combat or even of training that can be almost as deadly as combat itself.

Certainly, in some situations, space professionals work long, hard hours directly supporting a critical operation to save warrior lives—perhaps maneuvering a critical communications satellite into position so it can pick up the load from an overtasked asset. However, such action is not the norm. For the most part, these officers go back home to their families and lawns every day, even in wartime, never giving much thought to the possibility that their jobs may require the ultimate sacrifice at any time. In my personal experience, developing *esprit de corps* is much more problematic in an office environment than in an operational unit. These comments are not meant as a criticism—it is not the job of space officers, or of most other combat support specialties, to routinely put their lives on the line for their country. I mention the subject only to point out a critical and perhaps fatal impediment to the development of the warrior culture so desperately hoped for by space force advocates.

A wry smile seems an almost ubiquitous fixture on those officers who, having accumulated extensive experience in a “warrior command,” find themselves assigned to AFSPC and are then told how maneuvering their satellites makes them warriors. If more officers in the command actually experienced duty in combat operations, there would be no need for this section of this article. In my experience, the years spent as a warrior did not mark the pinnacle of my career; rather, I felt that I made my greatest contributions during my time in AFSPC delivering program after space-related program designed to keep warriors from dying needlessly. I was a support troop, and I knew it; however, my previous experience as a warrior allowed me to understand why my support was so important to the much bigger picture. A cross-cultural training program that exposes these officers to combat arms officers in the field, as outlined above, will go a long way toward allowing the space professional to gain such a perspective.

Conclusion

An effects-based way to integrate the three existing organizational domains of space, air, and cyberspace involves separating shooters and nonshooters, regardless of domain, thereby gaining synergies from organizing, training, and equipping the producers of combat effects and the producers of combat support effects in only two organizational locations. Essential to this reorganization, the training of all of our support troops needs to include close contact with warriors so they have a better understanding of why their support is so important and how it is actually used in the field. This separation of effects and training goals also transforms support troops' culture and mind-set, helping execute the broader mission by clearly distinguishing between the supporting and supported functions. Such a system

would also minimize (by almost a factor of two) the overhead money required to set up MAJCOMs that organize, train, and equip; instead of ACC, AFSPC, AFCYBER, and the AFISRA, we would now fund only a combat command and a combat support command.

A completely clean break between combat effects and combat support effects will never occur. However, separating functions on the basis of effects as much as possible can only lead to significant efficiencies in training for and prosecuting military actions in support of attaining national objectives. Focusing on effects instead of domain and exposing support officers to warriors through cross-flow assignments early in their careers will certainly enable the even more effective support that is surely the goal of all of us on the team. ✪

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Notes

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Airpower Security Cooperation as an Instrument of National Power

Lessons for Iraq from the Cases of Pakistan and Egypt

Lt Col Douglas G. Thies, USAF*

The environment of air dominance enjoyed by coalition air forces at the onset of Operation Iraqi Freedom portended a necessary and contemporary endeavor—the tasking of US and coalition partners with reconstituting the Iraqi Air Force. This effort presents an opportunity to engage the Iraqi state with a partnership in airpower security cooperation—an instrument through which policy makers may further US interests by influencing a recipient state.

Over the preceding decades, observers have offered differing opinions about the efficacy of security-cooperation policy tools, especially foreign military sales, and about whether or not these policies yield influence or merely subsidize a lucrative domestic defense industry. Those who assert the latter suggest that these allegedly profit-driven pursuits corrupt US foreign policy to the detriment of the nation's true security interests. Nonetheless, security cooperation has been consistently used as a component of broader US geopolitical strategies. During the Cold War, both sides used security cooperation extensively to balance the power of the opposition. Remnants of these relationships persist: the North Atlantic Treaty Organization (NATO) and South Korean cases in particular suggest that this policy tool facilitates long-term engagement with partners through which the United States may advance its interests. Yet, obvious cases sug-

gest that security cooperation by itself does not guarantee desirable developments; one need only recall that any furtherance of interests the United States sought to achieve by supporting the Shah's regime in Iran was nullified by its collapse from within, an event that resulted in the loss of a key regional ally and the concomitant acquisition of an enemy.

Security cooperation in all its forms, including foreign military sales, accompanying financial instruments, and various military-to-military relationships is a tool that the United States uses to shape geopolitical affairs. Given the certain prospect that Iraq will need the United States to maintain the integrity of its airspace and assist it in building an air force that will sustain progress toward domestic and regional security, it is prudent that policy makers understand how best to implement this policy tool. The question is what characteristics of airpower security cooperation are likely to produce a substantial level of productive influence over the long term.¹

To identify those characteristics, this article reviews past and ongoing airpower security cooperation efforts with Pakistan and Egypt, two states that share important traits with the future Iraqi state. Specifically, they both represent major regional actors as well as major non-NATO allies, have particular significance among Muslims due to their citizens' contributions to modern

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Islamist political ideology, and feature regimes that face significant domestic pressures from various Islamist opposition groups.² These two cases also provide the benefit of examining varying levels of success—measured by the extent to which these recipients have promoted regional stability and cooperated in areas such as nuclear nonproliferation and the global war on terror (GWOT). Overall these cases suggest that if the program of airpower security cooperation in Iraq wishes to bear diplomatic fruit, it must address the security paradigm of Iraq's strategic culture, maintain a suitable regional balance of power, and imbue itself with a sense of enduring US commitment to the partnership.

Why Airpower Security Cooperation Matters

Security-cooperation activities are rooted in states' interests. They are the manifestation of a relationship, opted for by political leaders, through which the supplier and recipient pursue their respective strategic goals. Great powers such as the United States provide weapon systems and military-to-military engagement to cajole the recipient's politicians into adopting favorable policies; other goals include balancing the power of a regional adversary, gaining access to real estate for force posturing, ensuring access to economic markets, and sustaining the health of the domestic defense industry. The lesser power not only seeks to improve its defense capabilities through acquisition of advanced hardware and training, but also anticipates that the relationship itself will buffer its national security and increase its regional and global status. In other words, the US position provides the recipient a partner that can further its interests among international institutions such as the United Nations, World Trade Organization, World Bank, and so forth.

Given these expectations, airpower-specific components of security cooperation are uniquely suited as a tool of influ-

ence due to their characteristically extensive duration. Foreign military sales of American air and space systems facilitate enduring relationships because of their decades-long life spans, over which the recipient requires material, training, and technical support (and in some cases, financial support). This factor yields opportunities for US Airmen to engage their foreign counterparts through policy instruments such as international military education and training (IMET), officer exchanges, combined training, exercises, and (potentially) combined operations. Over time, these relationships *can* provide political dividends in the form of influence. Pragmatically speaking, in many partnering states, the military is the most politically influential institution; by developing long-term relationships through airpower security cooperation, Washington maintains access to those individuals who may have the greatest capacity to influence the state's present and future policy decisions.³

From the perspective of the beneficiary, the value of airpower security cooperation derives from the inherently strategic value of airpower as a military instrument as well as the prestige associated with possessing and operating a modern air force. Two paramount examples that substantiate airpower's strategic value—and capacity to produce geopolitical shocks—are significant to the cases under consideration. The first is the Israeli Air Force's destruction of the Egyptian Air Force at the onset of the Six-Day War in 1967. The second and more recent example is the media-cataloged display of airpower's destruction of the world's fourth-largest army during the Gulf War in 1991. In each case, the effective use of airpower facilitated the demise of a major regional actor and permanently altered the state of regional affairs. The 1991 Gulf War in particular vaulted the status of US-manufactured airpower systems to unprecedented levels, to the extent that recipients garner what they perceive as added levels of prestige by possessing the American brand of airpower hardware—a sort of



“keeping up with the Joneses” among regional players.⁴

The offerings of airpower security cooperation—strategic value, prestige, and leverage in the international system—can greatly appeal to the desires of the recipient's *strategic culture*, a term that refers to the state's assumptions about the role of war and efficacy of the use of force in achieving political ends, the nature of the adversary, and the strategy and operational policies that result from these assumptions.⁵ Accordingly, when a design for airpower security cooperation accounts for strategic culture—the lens through which the recipient views its security situation—the United States can expect to gain substantial influence over time. This also requires that it carefully consider the balance of power in the recipient's region and make an attempt to impart a sense of commitment to the relationship. Failure to adequately do so can yield unintended consequences, as the history of the US-Pakistani relationship strongly suggests.

Pakistan: Episodic Engagement and Unintended Consequences

Valid reasons notwithstanding, the wavering commitment to airpower security cooperation over the years by the United States undermined Pakistan's sense of security vis-à-vis India, a fact that facilitated developments that did not bode well for US interests. Such developments included the horizontal proliferation of nuclear weapons, the co-opting of Islamist militant groups in the pursuit of “asymmetric strategies” to counter Indian power, and what became an increased potential for nuclear war in South Asia due to a growing imbalance of conventional power. These claims become clear when one considers the importance that Pakistan's strategic culture places on airpower and its role in ensuring survival of the state against its more powerful southern neighbor, a fear innate to Pakistan and culti-

vated by the series of wars fought in 1947–48, 1965, and 1971, and more recently sustained by limited conflicts that involved dangerous tinkering with “nuclear brinkmanship” by both sides.⁶

Throughout, airpower has been and continues to be a significant instrument through which the Pakistani strategic culture seeks to balance the numerically superior Indian armed forces. The success of the Pakistani Air Force in the 1965 and 1971 wars is reflected by the three-to-one kill ratio it achieved over its Indian counterpart.⁷ Today, it is important to note that the Pakistani Air Force's capabilities go beyond its conventional applications and have an overtly strategic purpose, insofar as its tactical fighters represent both a defense against India's strategic nuclear forces as well as an offensive means by which to employ nuclear weapons. Stated more simply, Pakistan's fighter fleet serves as the backbone of that country's deterrent posture.⁸

From the perspective of Pakistan's strategic culture, US airpower security cooperation has remained part and parcel of the state's airpower capabilities since 1957—hence, the state's capacity to balance India. Its operation of US weapon systems garnered confidence for Pakistan's airmen, who believed that they enjoyed a qualitative advantage over their Soviet-supplied rival.⁹ Thus, the US Congress's imposition of sanctions in 1989 under the guise of the Pressler Amendment to the Foreign Assistance Act in order to punish Islamabad for its indigenous nuclear weapons program effectively severed airpower security cooperation, representing a severe blow to Pakistan's perceived ability to counter its foe. Most painful was the cancelled sale and delivery of F-16s that the Reagan administration had offered as the crown jewel for Pakistan's cooperation in facilitating the anti-Soviet jihad in Afghanistan. From the Pakistani perspective, the Reagan administration had implicitly tolerated nuclear development as long as Islamabad did Washington's bidding in Afghanistan. After the Soviets' expulsion, sanctions soon followed,

engendering a belief in Islamabad that the new administration of Pres. George H. W. Bush had withdrawn from the security commitment as a matter of convenience. Whether or not the implementation of Pressler sanctions was justified, the severing of airpower security cooperation perpetuated a belief within Pakistan's strategic culture that Washington was a fickle security partner.¹⁰

With the benefit of hindsight, we now can assess the impact on state behavior that occurred as a result of the Pressler Amendment and the resultant degradation to Pakistan's airpower capabilities—and, more broadly speaking, its security confidence. Unfortunately, the ensuing decade witnessed Pakistan's strategic culture engaging in less desirable means to strengthen its security vis-à-vis India. Beginning in 1993, Pakistan developed a technological exchange with North Korea whereby it provided knowledge of uranium-enrichment processes in return for missile technology, facilitating Pyongyang's ability to eventually produce and test nuclear weapons—an outcome that continues to vex US policy makers and complicate international efforts to stem nuclear proliferation.¹¹ In addition, Islamabad supported an insurrection by Islamic militants in Kashmir in order to counter India's conventional superiority, resulting in a continuing series of skirmishes that has cost as many as 66,000 lives since 1989. This policy of co-optation of the Kashmir insurrection later led to suspicions in New Delhi that Islamabad was responsible for terrorist attacks inside India, including the attack on the Indian parliament in December 2001 as well as the more recent attacks in Mumbai.¹² Finally, in seeking “strategic depth,” Islamabad offered its support to the Taliban in Afghanistan—the now infamous hosts of Osama bin Laden and al-Qaeda prior to 11 September 2001.¹³ The amalgamation of these strategies created a dangerous environment of instability in South Asia characterized by episodes of vitriolic rhetoric, large maneuvers of conventional forces, and brinkmanship that culminated in the

testing of nuclear weapons by both sides—an event that led many people in the United States and elsewhere to fear that nuclear war in South Asia was imminent.¹⁴

The cancellation of airpower security cooperation with Pakistan also resulted in the troubling fact that the current airpower gap threatens escalation of the use of nuclear weapons in the event of conventional war with India. The airpower disparity makes the Pakistani Air Force's survival dubious against the better-equipped Indian Air Force; specifically, Pakistan's security planners assess that India would attain air superiority in rapid fashion and render Pakistan's strategic nuclear sites vulnerable to attack. This presumption of vulnerability leads to a doctrine of “early use” whereby, according to a widely held assumption, destruction of the Pakistani Air Force represents a “red line” beyond which Pakistan would employ nuclear weapons.¹⁵

Finally, termination of airpower security cooperation had the effect of severing US-Pakistani military-to-military relationships cultivated over time. After the Pressler Amendment, the IMET program, which brings foreign officers to US military schools, no longer accepted Pakistani airmen. Consequently, “Pakistani mid- and low-level officers are no longer ‘westward looking’ . . . and the U.S. military lost the opportunity to appreciate and understand the ethos, capabilities, orientation, and competence of the Pakistani military.”¹⁶ According to a panel of US flag-rank officers, “the lack of such relations with Pakistan during the 1990s . . . showed their consequences in the immediate aftermath of September 11,” when the United States would once again rely on airpower security cooperation as a means of obtaining Pakistani cooperation in regional matters.¹⁷

Since 2001, renewed efforts in airpower security cooperation with Pakistan have been robust, including plans to modernize the existing F-16 fleet as well as provide for the sale of state-of-the-art F-16s and their associated sensors, beyond-visual-range missiles, and precision-attack air-to-ground

weaponry. These and other airpower assets granted to Pakistan purportedly promote the state's ability to contribute to the GWOT. However, Pakistan's strategic culture will continue to assess how these systems contribute to its security with respect to India. Some members of Congress have voiced concerns that F-16 sales to Pakistan have little relevance to the GWOT and are more suited to fighting India; that may be true,



US Air Force photo

Lt Col Mujahid Khan inspects the landing-gear wheel well of one of the two F-16 Fighting Falcons transferred to Pakistan. Two upgraded Air Force F-16s were delivered to the Pakistani Air Force on 12 December 2005. Lt Col Mujahid Khan served as the Pakistani F-16 support program liaison at Hill AFB, Utah.

but strengthening Pakistan's defense vis-à-vis India is not necessarily a "bad thing."¹⁸ Rather, these ongoing additions to Pakistan's airpower capabilities may serve to restore a proper balance of power that obviates a Pakistani propensity to enact security strategies that include undesirable methods of the recent past.

Reengagement has yielded some measurable results. Pakistan's cooperation in the US-led GWOT represented an immediate manifestation of bilateral security cooperation following 11 September, as Islamabad offered the support of Pakistani intelligence services, access to Pakistani airspace by US combat aircraft, and logistical support of US operations in Afghanistan. Throughout Operation Enduring Freedom, Pakistan provided its support "without any of the formal agreements or user fees that are normally required for such privileges."¹⁹ Pakistan's cooperation also gave Washington access to valuable sources of human intelligence, providing an "important complement to U.S. technical and other means of intelligence collection," the impact of which not only aids the mission in Afghanistan but also enables Pakistani and US military and law-enforcement officials to conduct "direct, low profile efforts . . . in tracking and apprehending fugitive Al Qaeda and Taliban fighters on Pakistani territory."²⁰ Second, the period since the renewal of airpower security cooperation has seen a marked reversal in the deteriorating bilateral relationship between Islamabad and New Delhi. Bolstered by the renewed relationship, US influence was credited with gaining Islamabad's cooperation in banning militant operations in Pakistani-controlled areas of Kashmir, a development that allowed a return to diplomacy between Pakistan and India and helped avert full-scale war between the antagonists in 2002.²¹ Pakistan later took overt steps to reduce tensions and implemented confidence-building measures, including travel and commerce across the Kashmiri line of control as well as increases in bilateral trade.²²

Although the Kashmir issue remains a potential flashpoint, the countries' foreign ministers recently described talks between the two sides on the issue as "the most sustained and intensive dialogue" to date.²³ Finally and most importantly, Islamabad and New Delhi have taken steps to reduce tensions on the nuclear front by extending the moratorium on nuclear testing and establishing a hotline between their foreign ministers in order to prevent an accidental nuclear war. This trend toward improved relations has so far survived terrorist events that derailed such efforts in the past, suggesting that current progress in the direction of greater detente has substantial momentum.²⁴

Despite these positive returns on the US investment in airpower security cooperation, obvious disappointments have occurred—most notably the failure to contain the proliferation of nuclear-weapons technology from Pakistan to North Korea and other would-be proliferators as a result of the A. Q. Kahn network. The discovery of the latter prompted Washington to impose sanctions directly against the Khan Research Laboratories (as opposed to directly against the Pakistani government) from March 2003 to March 2005 and resulted in United Nations Security Council Resolution 1540, requiring states to criminalize trade activities related to proliferation. Pakistan has responded by passing a series of anti-proliferation legislation, but questions remain as to whether or not the state has the true intention or even the capacity to enforce these measures.²⁵ Nonetheless, at the very least, US airpower security cooperation provides a means to remain engaged with the Pakistani military—an organization that is not only the steward of Pakistan's nuclear forces but also realistically the most politically influential institution of the state. Doing so increases the opportunity for the United States to monitor the security of Pakistan's nuclear arsenal and perhaps better posture itself to become aware of illicit proliferation activities.

Other issues persist. Critics in Congress and elsewhere are quick to point to Pakistan's policy of appeasing the Taliban in northern tribal areas as well as the government's failure to adequately embrace transparent and fair democratic processes.²⁶ Both represent valid concerns over which Congress and the president should seek better results. However, in the midst of Pakistan's facing significant domestic and regional security challenges, policy makers would be wise to consider the prospect that unintended consequences might again result from severed airpower security cooperation; accordingly, other instruments of influence might prove more appropriate.

In sum, airpower is important to Pakistan as an instrument to balance Indian power, and although US sanctions that damaged the modernization of Pakistani airpower may have been justified, the growing airpower imbalance in South Asia has degraded the overall balance of power and resulted in a Pakistani reliance on asymmetric strategies and an unsettling early-use nuclear doctrine. Admittedly, it would be a stretch to single out severed airpower security cooperation as the sole or even preponderant factor in these trends. Rather, it is more accurate to state that Pakistani disappointment over its severed security relationship with the United States and growing disparity of its airpower capabilities contributed to its overall sense of insecurity with respect to India, resulting in security policies that engendered regional instability and countered American interests. Past efforts in airpower security cooperation simply failed to acknowledge realistically the paradigm of Pakistan's strategic culture, preserve an adequate balance of power, and imbue trust in its relationship with the United States. In contrast, the case of Egypt suggests that consistent and enduring airpower security cooperation can yield substantial diplomatic dividends over the long haul in the form of interstate regional stability, diplomatic and military cooperation, and nuclear nonproliferation.

Egypt: Consistent Cooperation / Consistent Results

Since the 1978 Camp David Accords engineered peace between Egypt and Israel, the United States has provided an average of \$2 billion per year in security assistance to Egypt, making it second only to Israel in the amount of military aid granted to any state.²⁷ The treaty followed a shift in grand strategy by Pres. Hosni Mubarak to pursue a tenable peace with Israel that would promote regional stability and facilitate economic growth. "Tenable" peace required that Egypt be made confident in its security vis-à-vis Israel. Accordingly, robust US airpower security cooperation was a key component of the deal through which Washington designed a specific regional balance of power that provided Egypt sufficient conventional deterrence while still maintaining a qualitative advantage for Israeli forces.²⁸ As a result, Egypt has bolstered its airpower capabilities through the acquisition of 220 F-16 aircraft, six E-2C early warning aircraft, 36 Apache helicopters, and the Patriot air defense system, each of which included substantial follow-on contracts for training and maintenance.²⁹ The program has also entailed extensive military-to-military contacts through IMET, enabling Egyptian officers to participate in a wide range of educational opportunities at US war colleges, command and staff colleges, and entry-level courses.³⁰ US and Egyptian airmen have also participated in combined training activities through officer exchanges such as the US Air Force's provision of F-16 Weapons School instructors to the Egyptian Air Force's Fighter Weapons School.³¹

Airpower strikes a chord with Egypt's strategic culture due to its role in shaping the regional interstate power structure. The 1967 Arab-Israeli war in particular showcased the ability of airpower to forge strategic outcomes when the Israeli Air Force executed a surprise attack on the Egyptian Air Force, spearheading the resounding Israeli

victory that after only six days resulted in Israel's doubling its size and occupying Egypt's Sinai territory. The political fallout engendered by the defeat brought about the demise of Pres. Gamal Abdel Nasser's grand ideology of Pan-Arabism and left Arab regimes in the region scrambling for legitimacy. The impact of airpower in 1967 was not lost on Nasser's successor, Anwar Sadat, whose respect for the Israeli Air Force led him to limit the advance of the Egyptian Army to stay within the protection of Egyptian air defense systems in the 1973 October War.³² This strategy underscored the degree to which Egypt's strategic culture assessed its security vis-à-vis Israel as being directly related to its ability to counter Israeli airpower. By providing Cairo with a means to maintain a suitable balance of power, Washington has successfully used airpower security cooperation to garner influence with a major regional actor toward the betterment of regional stability.³³

Of course, assessing "regional stability" in the Middle East (and the Levant in particular) requires one to view what has transpired with a "glass half full" approach. This fact is salient: thus far US provision of airpower security cooperation to Egypt has contributed to quelling interstate conflict between Egypt—the largest and perhaps most influential Arab state—and Israel. This is no small matter, considering that the last time these two actors fought, US and Soviet forces were nearly drawn into conflict, prompting the only occurrence other than the Cuban missile crisis when US nuclear forces went on full-scale alert.³⁴ Obviously, interstate peace facilitated by the current balance of power has yet to bear the fruit of comprehensive regional peace, as evidenced by ongoing conflicts between the Israelis and Palestinian factions within the occupied territories of the West Bank and Gaza, as well as with external, nonstate actors in Lebanon.³⁵

In lieu of continuing regional challenges to peace, the United States receives dividends from its investment in airpower security cooperation through Egypt's consistent

role as a reliable broker in the region, especially in negotiations pertaining to what many perceive to be the root cause of instability and rancor throughout the Middle East—the Israeli-Palestinian conflicts that have persisted since the foundation of the Israeli state. Egypt endorsed the Declaration of Principles signed by the Palestinian Liberation Organization in 1993 and hosted talks between the Israelis and Palestinians in 1999, 2000, 2005, and 2007.³⁶ The goal of achieving lasting peace between the Israelis and Palestinians remains elusive, but one can be sure that when it occurs, Egypt will have served as a principal facilitator—a role made possible in part because US airpower security cooperation sufficiently bolsters the Egyptian strategic culture's confidence in its security with respect to Israel.

The value that Egypt adds in political and security matters is not merely confined to the immediate neighborhood and Israeli-Palestinian issues. Perhaps the greatest manifestation of its cooperation came in 1991, when Egyptian armed forces participated in the allied coalition during Operation Desert Storm that expelled Iraq from Kuwait.³⁷ Egypt's status as the most populous Arab state gave an element of legitimacy to the coalition that has been noticeably absent in subsequent endeavors. Subsequently, Egypt has also contributed to international military peacekeeping efforts in Somalia, Yugoslavia, Sudan, Liberia, East Timor, Pakistan, and Afghanistan.³⁸

In the contemporary security environment, Egyptian contributions to the US-led GWOT are less direct but no less critical. Cairo's provision of overflight rights and access to the Suez Canal by US warships represents a measure of cooperation without which logistical support of US forces in Central Command would be severely degraded. Egypt also provided training to the nascent Iraqi security forces and was one of the first countries to send an ambassador to Iraq in 2005.³⁹ On the diplomatic front, Egypt hosted the International Compact with Iraq and Expanded Iraq Neighbors conferences in 2007, once again affording the United

States a diplomatic partner that has the capacity to add much-needed legitimacy to its regional pursuits.⁴⁰

Finally, US airpower security cooperation has directly contributed to Egypt's status as a state that embraces the nonproliferation of nuclear weapons despite Israel's policy of "ambiguity" and alleged possession of a nuclear arsenal. Egypt's nonnuclear course came about as a result of the Camp David Accords, when President Sadat renounced nuclear weapons as a facet of the state's security strategy.⁴¹ Under President Mubarak, Egypt became a signatory member of the Nuclear Non-Proliferation Treaty in 1981 and has since consistently called for the establishment of a nuclear-free Middle East. However, Cairo continues to be frustrated by Israel's refusal to follow suit and in response has refused to sign the Chemical Weapons Convention or endorse the US-sponsored multilateral Proliferation Security Initiative.⁴² Regardless, because of Egypt's status in the Middle East, its choice to forgo any pursuit of nuclear weapons has thus far helped keep a lid on proliferation throughout the region.

Pakistan's and Egypt's Different Nuclear Choices

It is interesting to note that Egypt's nuclear choices stand in stark contrast to those made by Pakistan—especially when considering that each state considered its nuclear options while measuring its security against a nuclear-capable adversary. The question arises as to what factors engendered the disparity between the two. A superficial review of causal factors yields two notable differences. First is the disparity in perceived US commitment to the security of the recipient. By the time Pakistan contemplated its nuclear choices in response to India's successful testing of a nuclear weapon, the United States had already completed a cycle of aid provision followed by sanctions and aid termination. Three cycles of on-again/off-again airpower security cooperation

with Pakistan have occurred (1953–61, 1979–89, and 2001–present).⁴³ In contrast, US commitment to Egypt since 1978 has remained consistent and unwavering. Second is the disparity in influence that the United States possesses over each recipient's principal rival. In the case of Pakistan, US influence with India traditionally has been limited, whereas its influence with respect to Israel has been and continues to be substantial. Although Cairo can plausibly assume that Washington has the capacity to act on its behalf in dealings with the Israeli government, Islamabad could not entertain such notions with respect to New Delhi at the time it considered its nuclear options. In such a case, it is likely that only some form of security guarantee with the United States could dissuade a recipient from attempting to acquire nuclear weapons.

In the absence of either sufficient influence over the adversary or a security guarantee, a recipient's nuclear choices become constrained to either obtaining an indigenous deterrent or accepting a subjugated security status. In the contemporary era, these choices become significant due to the mounting proliferation pressures caused by Iran's alleged nuclear program. Washington's comprehension of how the instrument of airpower security cooperation affects its recipients' nuclear choices is important because many of Iran's neighboring states are beneficiaries. One of these states, of course, is Iraq. However, unlike the previous two examples, the United States has the unique opportunity to literally implement airpower security cooperation from the ground up.

Airpower Security Cooperation with Iraq: Some Considerations

Obviously, Washington's immediate concerns with respect to Iraq pertain more to establishing domestic security and legitimacy of the constitutional government than to pondering how the state will emerge as a

regional player. In the near term, airpower security cooperation implemented by the Coalition Air Force Transition Team will likely focus on building an Iraqi Air Force that has the capacity to provide effective support to Iraqi security forces in counterinsurgency missions such as surveillance and reconnaissance, transport and mobility, medical evacuation, and offensive fire support.⁴⁴ The near-term focus on counterinsurgency requires the US Air Force to defend Iraqi airspace against intrusion until the Coalition Air Force Training Team's efforts transition to provide the Iraqi Air Force with a greater level of capability. Policy makers will soon have to decide the appropriate time for this transition, considering the Iraqi government's recent inquiry about purchasing F-16s.⁴⁵ Given that Iraq will almost certainly remain a unitary state where the United States desires to maintain a substantial measure of influence, it will be important to recall the lessons of the Egypt and Pakistan cases. Specifically, if implemented in a manner that addresses Iraq's strategic culture, maintains an appropriate regional balance of power, and inculcates commitment and trust, airpower security cooperation will provide a means of influencing Iraq to adopt policies that promote regional stability, facilitate diplomatic and military cooperation, and support nuclear nonproliferation.⁴⁶

Fortunately, Washington has some capacity to control two of these necessary tenets. First, as long as political will is sufficient, the United States can build trust through its persistent commitment. Second, the fact that the United States engages in airpower security cooperation with many of Iraq's neighbors means that Washington can affect the regional balance of power. However, unlike the previous two cases, in which balance of power was measured against a principal rival, Iraq exists in a more multipolar security environment, making it difficult to predict the future paradigm of Iraq's strategic culture. Although the appropriate formula for future Iraqi airpower capabilities is not yet clear, maintain-

ing an appropriate balance of power in the region yields the prediction that the future Iraqi Air Force will possess capabilities that provide for the sovereign defense of Iraqi airspace, have limited offensive reach, and qualitatively match those of neighboring states while possessing a clear advantage over Iranian air forces.

The options available to the commander in chief regarding future policy in Iraq will be constrained by the fact that a precipitous withdrawal of the US Air Force would create

an airpower vacuum that would destabilize the region. This assertion leads one to predict a US Air Force presence extending well beyond the day when US ground troops depart; it also presents an opportunity to use airpower security cooperation as an instrument that furthers US interests—and, by necessity, Iraqi interests. Given the stakes, policy makers would be wise to use the lessons of Pakistan and Egypt to get it right. ★

Fort Belvoir, Virginia

Notes

1. The term *airpower security cooperation* is not doctrinal; this article uses it to represent security cooperation programs that benefit the recipient nation's airpower capabilities. For a concise theory regarding influence derived through arms transfers, see T. V. Paul, "Influence through Arms Transfers: Lessons from the U.S.-Pakistani Relationship," *Asian Survey* 32, no. 12 (December 1992): 1078–92.

2. Gilles Kepel describes the ideological contributions to the rise of political Islam by men such as Egypt's Sayyid Qutb (intellectual leader of the Muslim Brotherhood) and Pakistan's Mawlana Mawdudi (founder of Jamaat-e-Islami). See Kepel's book *Jihad: The Trail of Political Islam*, trans. Anthony F. Roberts (Cambridge, MA: Belknap Press of Harvard University Press, 2002), 23–42.

3. US policy is that security cooperation activities will promote the proliferation of democratic governance, robust civil societies, and human rights. Some critics suggest that providing materiel support to governments in which the military maintains excessive influence violates this principle. The author contends that security cooperation is best viewed as a tool of realpolitik that is best suited to making the recipient nation confident in its security, after which one can realistically pursue these more idealistic and worthy goals.

4. Prior to Operation Desert Storm, the Soviets, French, and British shared in exports to the region; in the years following, however, US suppliers dominated. Joe Stork, "The Middle East Arms Bazaar after the Gulf War," *Middle East Report*, no. 197 (November–December 1995): 14–17, 19.

5. This definition of *strategic culture* comes from Kanti Bajpai, "Indian Strategic Culture," in *Strategic*

Asia 2006: Military Modernization in an Era of Uncertainty, ed. Ashley Tellis and Michael Wills (Washington, DC: National Bureau of Asian Research, 2005), 246–47. Regarding Pakistan's strategic culture, see the chapter in the same text by Hasan-Askari Rizvi, "Pakistan's Strategic Culture."

6. K. Alan Kronstadt, *Pakistan-U.S. Relations*, CRS Report for Congress, RL33498 (Washington, DC: Congressional Research Service, 30 May 2008), 34–37, <http://fpc.state.gov/documents/organization/108080.pdf>. See also Duncan L. Clark, Daniel B. O'Connor, and Jason D. Ellis, *Send Guns and Money: Security Assistance and U.S. Foreign Policy* (Westport, CT: Praeger, 1997), 38–40; and Joseph Cirincione, Jon B. Wolfsthal, and Miriam Rajkumar, *Deadly Arsenals: Nuclear, Biological, and Chemical Threat* (Washington, DC: Carnegie Endowment for Peace, 2005), 240–43.

7. The kill-ratio figure was supported by Brig Gen Chuck Yeager, US defense representative to Islamabad at the time. "PAF Air-to-Air Kills," *Pakdef.info: Pakistani Military Consortium*, <http://www.pakdef.info/pakmilitary/airforce/1971war/pafkills71.html> (accessed 11 June 2008). Also, Pakistani pilots saw action outside the region by serving with other states' air forces in the Arab-Israeli wars of 1967 and 1971, as well as the Yemeni Civil War in 1969 (*ibid*).

8. Cirincione, Wolfsthal, and Rajkumar, *Deadly Arsenals*, 250.

9. Brig Gen Feroz Khan, Pakistani Army, retired, and professor, Naval Postgraduate School, Department of National Security Affairs, interview by the author, 28 August 2007.

10. The Pressler Amendment to the Foreign Assistance Act required the president to certify the nonexistence of a Pakistani nuclear weapons program

as a precondition for the vast amount of military aid granted to Pakistan. The Reagan administration regularly did so despite some indications to the contrary. At one point, the administration threatened sanctions and then reversed course by advocating an increase in security-assistance funding, indicating that Pakistan's cooperation in supporting the anti-Soviet jihad supplanted any discomfort about its domestic nuclear ambitions. Statements made by former assistant secretary of state James Coon substantiate the existence of a tacit understanding that the Reagan administration could tolerate Pakistan's nuclear development as long as it did not overtly test a weapon. After the Pressler sanctions were invoked, Prime Minister Benazir Bhutto expressed Pakistan's confusion over the American policy, stating that the US position had changed from one of "stay where you are" to "roll back your program." Later, during the Clinton administration, Prime Minister Nawaz Sharif threatened legal action regarding the undelivered F-16s, resulting in the administration's offer to repay 70 percent of the cost outright, with the other 30 percent paid through donated wheat and other commodities. At this point, the F-16 deal was essentially closed. Dennis Kux, *The United States and Pakistan, 1947–2000: Disenchanted Allies* (Washington, DC: Woodrow Wilson Center Press, 2001), 247–61, 310, 326–27.

11. Cirincione, Wolfsthal, and Rajkumar, *Deadly Arsenals*, 252. Also, "in late 2003 . . . inspections in Iran and a decision by Libya in December to renounce its WMD [weapons of mass destruction] programs provided evidence that Pakistani scientists had supplied nuclear technology to Iran, Libya, and North Korea. Pakistani officials denied any government knowledge of such cooperation and at first, denied that A. Q. Khan (former head of Khan Research Laboratories) and his associates had assisted Libya or North Korea. Khan confessed to his proliferation misdeeds in early February 2004 and was pardoned by President Musharraf immediately. . . . It was not until President Musharraf published his memoirs in September 2006 that he admitted nuclear technology had been sold to North Korea." Sharon A. Squassoni, *Weapons of Mass Destruction: Trade between North Korea and Pakistan*, CRS Report for Congress, RL31900 (Washington, DC: Congressional Research Service, 28 November 2006), 2, <http://fpc.state.gov/documents/organization/77721.pdf>.

12. Kronstadt, *Pakistan-U.S. Relations*, 34. See also C. Christine Fair, *The Counterterror Coalitions: Cooperation with Pakistan and India* (Santa Monica, CA: RAND Corporation, 2004), 7, http://www.rand.org/pubs/monographs/2004/RAND_MG141.pdf.

13. Jane Perlez, "Taliban Leader Flaunts Power inside Pakistan," *New York Times*, 2 June 2008, 1.

14. Cirincione, Wolfsthal, and Rajkumar, *Deadly Arsenals*, 240–43.

15. *Ibid.*, 247.

16. Fair, *Counterterror Coalitions*, 12. Pakistan's participation in United Nations peacekeeping provided a conduit for US-Pakistani military contact outside normal channels. In some instances, Pakistan was allowed to obtain spare parts for sustaining military equipment despite sanctions: "For example on August 13, 2001, President Bush granted a one-time waiver of sanctions that permitted the spare parts sales for Pakistan's Cobra helicopters and armored personnel carriers as well as ammunition to support Pakistan's contribution to peacekeeping activities in Sierra Leone" (*ibid.*, 13).

17. Michael R. Chambers, comp., "U.S. Military Perspectives on Regional Security in South Asia," in *South Asia in 2020: Future Strategic Balances and Alliances*, ed. Michael R. Chambers (Carlisle, PA: US Army War College, Strategic Studies Institute, November 2002), 231–32, <http://www.strategicstudiesinstitute.army.mil/pdffiles/00105.pdf>.

18. Current modernization plans include 46 midlife upgrade kits for F-16A/B models with an option to purchase more and 18 new F-16C/D Block 50/52 models with an option for 18 more. Armaments include 500 advanced medium-range air-to-air missiles, 500 Joint Direct Attack Munition tail kits, 1,600 laser-guided-bomb kits, 100 Harpoon antiship missiles, and 500 Sidewinder air-to-air missiles. Other airpower assets provided via foreign military sales and excess defense articles include eight P-3 Orion maritime patrol aircraft, six surveillance radars, six C-130E transport aircraft, 20 AH-1 Cobra attack helicopters, 16 T-37 aircraft with 20 more pending, four F-16 A/B aircraft with 10 more pending, and 26 Bell 412 helicopters. Kronstadt, *Pakistan-U.S. Relations*, 52–54.

19. Fair, *Counterterror Coalitions*, 15. Pakistani contributions to US military operations during Enduring Freedom have been extensive. According to briefings given by Central Command personnel, by 2002 Pakistan had already contributed 35,000 army personnel for internal security and operations support and another 7,000 personnel from the air force. The Pakistani Air Force also deployed radars and moved two squadrons in support of US forward operating bases and activated three additional bases. Perhaps most significantly, Pakistan made two-thirds of its airspace available for the transit of US combat sorties into Afghanistan, resulting in 28,000 sorties from 1 October 2001 to 7 March 2002, enabling persistent air cover over Afghanistan in support of ground forces engaging the Taliban and elements of al-Qaeda. Also, according to Central Command, Pakistani maritime cooperation has assisted the US Navy in providing

"freedom of operations within areas proximate to Pakistan" (ibid., 27–28, 31).

20. Ibid., 32; and Kronstadt, *Pakistan-U.S. Relations*, 15. Further, as of 2002, Pakistani authorities remanded to US custody approximately 500 such fugitives, including key al-Qaeda members such as Abu Zubaydah, Ramzi bin al-Shibh, Khalid Sheik Mohammed, and Abu Faraj al-Libbi. Kronstadt, *Pakistan-U.S. Relations*, 41.

21. In response to visits by US Deputy Secretary of State Dick Armitage, Musharraf banned Hizbul Mujahideen activities in Pakistan-controlled Kashmir and barred the leader of outlawed Jaish-e-Mohammed from entering Pakistani-controlled Kashmir. Cirincione, Wolfsthal, and Rajkumar, *Deadly Arsenals*, 242–43.

22. Kronstadt, *Pakistan-U.S. Relations*, 35.

23. Ibid., 36.

24. Former president Musharraf and his Indian counterparts found a way to facilitate cooperation in response to terrorism through the creation of a "joint terrorism network," whereby Pakistani and Indian officials agree to meet quarterly to share information garnered from investigations into terrorist incidents as well as any information that can be used to prevent terrorist attacks. The new framework for cooperation was tested in February 2007, when two bombs exploded on an Indian passenger train, killing 68 people; days after, the two foreign ministers reaffirmed their commitment to the peace process despite such efforts to ruin it. In 2006, despite a cessation of foreign-secretary-level talks following the July terrorist bombings in Bombay, President Musharraf and Indian prime minister Manmohan Singh announced resumption of formal peace negotiations and the creation of a "joint anti-terrorism mechanism." Kronstadt, *Pakistan-U.S. Relations*, 35.

25. Cirincione, Wolfsthal, and Rajkumar, *Deadly Arsenals*, 247–50.

26. In what many people suggest represented a stark example of the government's limited capacity to effectively counter pro-Taliban militants in the Federally Administrated Tribal Area, Islamabad shifted to a strategy of reconciliation with pro-Taliban militants. This policy immediately engendered disappointment and skepticism in the United States and has since been judged "to have failed in its central purposes" and to have "inadvertently . . . allowed foreign (largely Arab) militants to obtain safe haven from which they can plot and train for terrorist attacks against U.S. and other Western targets." Kronstadt, *Pakistan-U.S. Relations*, "Summary" and 43.

27. Jeremy M. Sharp, *Egypt: Background and U.S. Relations*, CRS Report for Congress, RL33003 (Washington, DC: Congressional Research Service, 14 June 2006), 1, <http://fpc.state.gov/documents/organization/68818.pdf>.

28. Egypt's "switch" from a Soviet client state to a US client state in the realm of arms sales had vast implications in the context of the Cold War. For the Soviets, Egypt had put a significant dent in their prestige; the Soviet-supplied Egyptian Army suffered defeat in 1967 and was teetering on annihilation before superpower diplomatic intervention in 1973. Sadat's subsequent alignment with the United States for arms was all the more embarrassing. Some scholars have suggested that these developments are one factor that compelled the Soviets to intervene on behalf of communist elements in Afghanistan. Also, for the United States, the new relationship with Egypt became increasingly important after the loss of Iran as a Middle East ally following the Islamic Revolution in 1979. For a Soviet view of Cold War arms transfers, see Andrei V. Shoumikhin, "Soviet Policy toward Arms Transfers to the Middle East," in *Arms Control and Weapons Proliferation in the Middle East and South Asia*, ed. Shelley A. Stahl and Geoffrey Kemp (New York: St. Martin's Press in association with the Carnegie Endowment for International Peace, 1992), 221–27.

29. US Department of State, "Egypt: Security Assistance," <http://state.gov/t/pm/64696.htm> (accessed 24 September 2007); and "Egypt Requests 2 Used E-2Cs," *Defense Industry Daily*, 29 June 2008, <http://www.defenseindustrydaily.com/egypt-requests-2-used-e-2cs-04130/> (accessed 11 May 2009).

30. US Department of State, "Egypt: Security Assistance." IMET funding for Egypt was \$1.2 million in fiscal year 2007.

31. Maj Scott Arbogast, F-16 pilot, Air National Guard, Washington, DC, and former exchange officer to the Egyptian Air Force, e-mail interview by the author, 30 October 2007.

32. The Egyptian air defense umbrella consisted of Soviet-supplied surface-to-air missile systems. Sadat's limited military objectives were designed to strengthen Egypt's negotiating position vis-à-vis the Israelis.

William L. Cleveland, *A History of the Modern Middle East*, 3d ed. (Boulder CO: Westview Press, 2004), 375–76.

33. President Mubarak reflects upon Egypt's strategic cultural emphasis on the balance of power: "History has taught us that the cause behind many wars is the weakness of one side. . . . Therefore, peace and stability must exist under the umbrella of a military force that protects and preserves them." Hillel Frisch, "Guns and Butter in the Egyptian Army," in *Armed Forces in the Middle East: Politics and Strategy*, ed. Barry Rubin and Thomas A. Keaney (Portland, OR: Frank Cass, 2002), 96.

34. Daniel Yergin, *The Prize: The Epic Quest for Oil, Money, and Power* (New York: Free Press, 1991), 604–5. See also Cleveland, *History of the Modern Middle East*, 375.

35. Regarding the latter, it is notable that Cairo blamed Hezbollah for inciting the Israeli bombings of Lebanon in 2006; this view, as well as Mubarak's assertion that Hezbollah's regional influence is a "product of the malign influence of Iran and Syria in the region," conveys the extent to which Cairo's positions on regional matters are in many ways aligned with those of Washington.

36. Sharp, *Egypt: Background and U.S. Relations*, 13. See also Steven Erlanger, "Backing Fatah and Abbas: Egypt Organizes Summit Meeting for Palestinian Leader," *New York Times*, 22 June 2007.

37. Egyptian forces suffered nine killed and 74 wounded in the fighting. US and Egyptian officers said that the combined training afforded by the Bright Star military exercises was instrumental in facilitating US-Egyptian cooperation and military compatibility during Desert Storm. Bright Star exercises in 1999 included 66,000 personnel from 11 states, including Egypt, the United States, France, the United Kingdom, Italy, Greece, and Kuwait. Frisch, "Guns and Butter in the Egyptian Army," 101. See also Sharp, *Egypt: Background and U.S. Relations*, 5, 25. Also, as a reward for Egypt's participation, the United States subsequently cancelled \$7 billion of Egypt's military debts. Cleveland, *History of the Modern Middle East*, 481.

38. Sharp, *Egypt: Background and U.S. Relations*, 26. See also US Department of State, *Congressional Budget Justification: Foreign Operations, Fiscal Year 2008* (Washington, DC: US Department of State, 2008), 484, <http://www.state.gov/documents/organization/84462.pdf> (accessed 27 November 2007).

39. "In late 2004 an Iraqi infantry company was invited to Egypt to participate in a joint training program with the Egyptian army. According to the Egyptian government, 134 soldiers from Iraq's 5th Infantry Division trained alongside Egypt's 3rd Infantry Division at the Mubarak Military City in northern Egypt." Christopher M. Blanchard and Catherine Marie Dale, *Iraq: Foreign Contributions to Stabilization and Reconstruction*, CRS Report to Congress, RL32105 (Washington, DC: Congressional Research Service, 26 December 2007), CRS-9, <http://www.usembassy.it/pdf/other/RL32105.pdf> (accessed 11 May 2009).

40. Secretary Condoleezza Rice, "Remarks at the International Compact with Iraq Ministerial," 3 May 2007, US Department of State, <http://www.state.gov/secretary/rm/2007/may/84210.htm> (accessed 11 June 2008). See also Secretary Condoleezza Rice, "Intervention Remarks at Expanded Iraq Neighbors Meeting," 22 April 2008, US Department of State, <http://www.state.gov/secretary/rm/2008/04/103873.htm> (accessed 11 June 2008).

41. Robert J. Einhorn, "Egypt: Frustrated but Still on a Non-Nuclear Course," in *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, ed. Kurt M. Campbell, Robert J. Einhorn, and Mitchell B. Riess (Washington, DC: Brookings Institution Press, 2004), 51.

42. *Ibid.*, 50–55; and Lt Col Pat Christian, US Army, Proliferation Security Initiative Cell Lead for the US Strategic Command Center for Combating Weapons of Mass Destruction, interview by the author, 9 June 2008.

43. In response to the Indo-Pakistani wars of 1965 and 1971, the United States suspended military assistance to Pakistan and India. See K. Alan Kronstadt, *Pakistan-U.S. Relations*, CRS Report for Congress, RL33498 (Washington, DC: Congressional Research Service, 24 August 2007), 10–11, <http://fpc.state.gov/documents/organization/91857.pdf>. See also Clark, O'Connor, and Ellis, *Send Guns and Money*, 38–40.

44. Recently published US Air Force doctrine on irregular warfare states that "the best way to apply airpower in IW [irregular warfare] is often by, with, and through the PN's [partner nation's] air force." Air Force Doctrine Document 2-3, *Irregular Warfare*, 1 August 2007, 28–29, <http://www.fas.org/irp/doddir/usaf/afdd2-3.pdf>. Further, in the author's opinion, airpower's provision of fire support to ground forces engaged in counterintelligence is no simple matter, given the complexities of mitigating collateral damage. If the wrong target is hit due to misidentification, errors in coordinates or target marking, language barriers, or simply weapon system malfunction (which, probabilities suggest, will sometimes occur), adverse outcomes could result in ascribing blame and could engender mistrust between Iraqi ground forces and US pilots. However, eliminating fire support from coalition airpower assets portends a tactical disadvantage for the Iraqi military unless the Iraqi Air Force is built to provide indigenous fire support that is precise, flexible, and responsive. Firepower could come from helicopter, fixed-wing, or unmanned platforms. The critical requirements are that the assets be survivable in the contemporary counterintelligence environment and that the sensor-weapon combination provide a high level of precision and small yield so as to mitigate collateral damage.

45. "Iraqi Government Ponders Ordering F-16s," *Augusta Chronicle*, 27 September 2008, *Military.com*, <http://www.military.com/news/article/iraqi-government-ponders-ordering-f16s.html?col=1186032320397> (accessed 24 October 2008).

46. If the Iranian nuclear program results in widespread proliferation throughout the region, there is no guarantee that US policy would dissuade regional states from countering Iran with their own nuclear deterrents.



Recent US and Chinese Antisatellite Activities

Lt Col James Mackey, USAF

Recent antisatellite (ASAT) activities by the United States and China have revived questions regarding space warfare, the follow-on effects of potential satellite destruction on a massive scale, national accountability, and technological challenges to mitigate offensive threats. Many of these same questions, which emerged during the initial space race and Cold War, have taken on new emphasis in light of growing multinational dependence upon satellites and the freedom to access space. This article briefly reviews the history of US and Soviet ASAT capabilities and testing during the Cold War, examines the recent Chinese shoot-down of its failed Feng Yun-1C satellite and the US shoot-down of the failed USA-193 satellite, and compares and contrasts these two ASAT missions, highlighting the follow-on threats to other nations' satellites. It also presents mitigating strategies that may lessen the threat of future offensive countersatellite operations, including enhanced situational awareness, improved survivability/reduced vulnerability, and increased sustainability; it then offers a brief look at countries capable of offensive countersatellite operations.

Military Antisatellite Programs during the Cold War

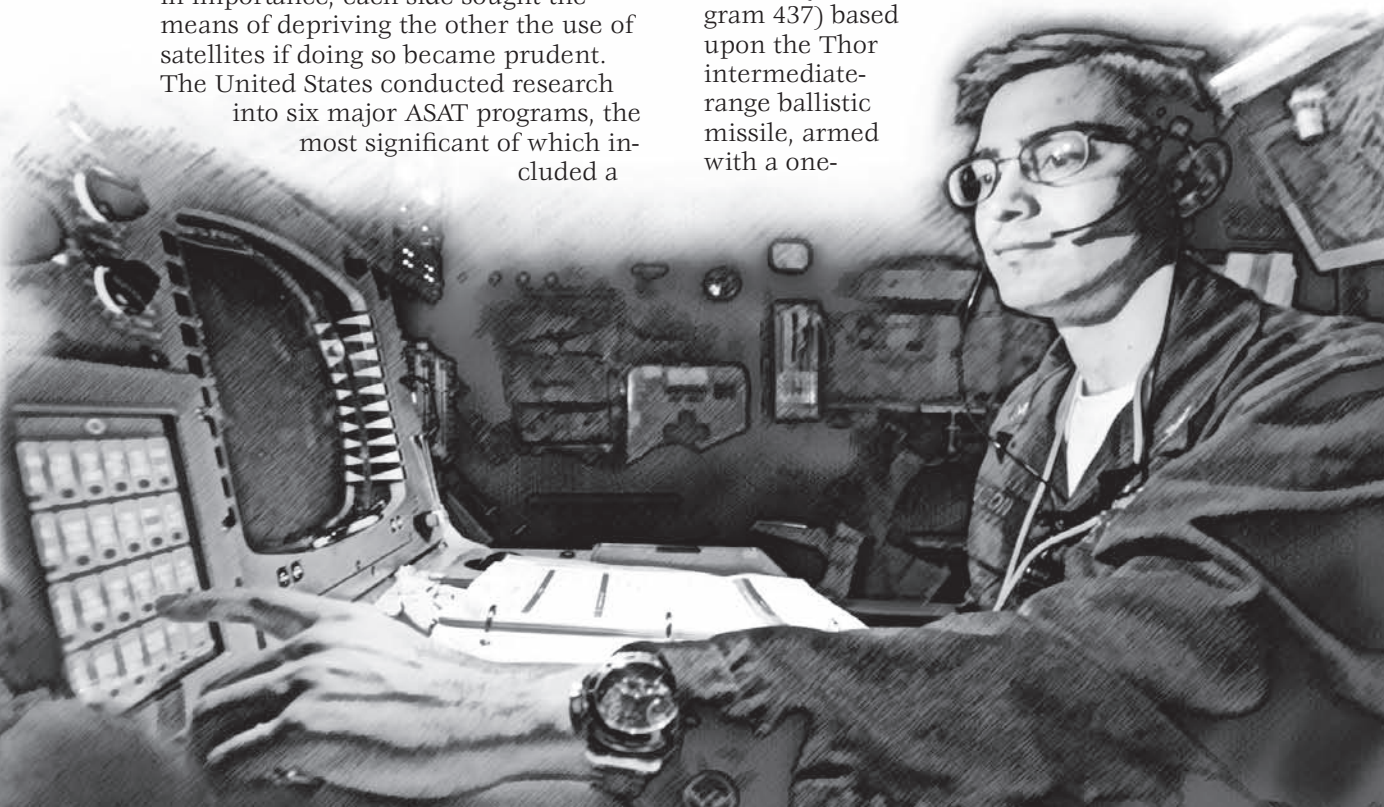
A military presence has accompanied human activity in space from its inception. Nevertheless, despite the intense rivalry between the United States and Soviet Union during the Cold War, space remained a weapons-free region and continues to do so. The Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, often called the Outer Space Treaty, put into effect 10 October 1967, codified this concept by calling on the 91 signatories "to refrain from placing in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction or from installing such weapons on celestial bodies."¹ One possible intent of the treaty was to dissuade an arms race in space.

During the Cold War, as satellites grew in importance, each side sought the means of depriving the other the use of satellites if doing so became prudent. The United States conducted research

into six major ASAT programs, the most significant of which included a

satellite interceptor, later renamed satellite inspector; an aircraft-launched two-stage interceptor missile; a Navy sea-based interceptor missile; and an Army ground-based interceptor missile.² Many of the early systems relied on nuclear warheads or those with very high explosive yield due to the inherent inability to precisely target satellites moving at high relative speeds. Other means for attacking enemy satellites included kinetic kills; destruction of ground-based radar and command, control, and communications facilities; and jamming of communications links.

As the threat of Soviet intercontinental ballistic missiles began to grow, Secretary of Defense Robert McNamara approved the testing of an antiballistic missile system based on the Nike-Zeus rocket (known as Program 505) as an ASAT system limited to a maximum altitude of 200 miles.³ Following promising results, the Air Force solicited a more robust capability (known as Program 437) based upon the Thor intermediate-range ballistic missile, armed with a one-



megaton nuclear warhead and providing a range of 700 miles with a kill radius of five miles in orbit. Testing of Program 437 began in February 1964 and terminated on 1 April 1975.⁴

Launching from combat aircraft would offer a more flexible ASAT capability. Attempts to employ aircraftborne ASAT missiles began in the late 1950s, highlighted by the launch of a Bold Orion missile from a B-47 bomber. Pres. Gerald R. Ford's directive of 1975 allowed exploration of air-launched ASAT missiles, resulting in creation of an ASAT program that year which employed a modified standard antiradiation homing missile fired from an F-15 fighter. This system represented a significant improvement over earlier ones insofar as it employed a kinetic-kill minivehicle to directly impact the targeted satellite versus an area weapon such as nuclear or high-explosive warheads. On 13 September 1985, a "full-up" test resulted in the destruction of the P78-1 Solwind satellite, but in 1988 Congress canceled the program.⁵ Further US ASAT tests focused on denial of use rather than absolute destruction of enemy satellites, as in a 1997 test in which a laser temporarily blinded an Air Force MSTI-3 satellite at 300 miles altitude.⁶

The Chinese Antisatellite Program

China's military has undergone tremendous change over the last 15–20 years, accelerating the pace over the last 10 years in a quest to revolutionize its military forces by reducing personnel numbers and focusing on a massive modernization program that emphasizes quality over quantity. Current military theory in China is partially based on capitalizing on its own resources to mitigate the advantages of potential high-technology opponents. This thinking is evident in China's self-described "Assassin's Mace" programs, a war-fighting strategy of the People's Liberation Army designed to

give a technologically inferior military advantages over technologically superior adversaries and thus change the direction of a war.⁷

Although China has not published an official document on space warfare, it is incorporating space-based support systems into all aspects of its military operations. This tactic includes denying adversaries the use of their space-based systems through kinetic-kill capabilities, jamming, and blinding. China continues to build up its organic space-based systems, seeking to develop into a modern military power capable of force projection and high-intensity military operations.⁸ China pursues research into other nonkinetic weapons for use in satellite targeting, including high-powered lasers, microwaves, particle beams, and electromagnetic-pulse devices, all intended to render enemy satellites inoperable without the debris field associated with kinetic-killing weapons.⁹ Investment in such weapons technology fits China's asymmetric approach and desire to provide a credible threat. In *Joint Space War Campaigns*, Col Yuan Zelu loudly echoes this approach, declaring that the "goal of a space shock and awe strike is to deter the enemy, not to provoke the enemy into combat."¹⁰

On 11 January 2007, China became the third known country with a proven ASAT capability when it conducted an unannounced launch of a Deng Fong-21 / Kai Tuo Zhe-1 (DF-21/KT-1) against its own defunct Feng Yun-1C meteorology satellite.¹¹ This event confirmed intelligence estimates of Chinese ASAT developments. Given the secretive nature of the Chinese government, most of the details remain hidden from the public, with most of what is known based upon observation and established Chinese capabilities. (This article draws upon publicly available sources for its references to technical data and capabilities.)

The Chinese launched the Feng Yun-1C ("Feng Yun" is Chinese for "wind and cloud"), a polar-orbiting meteorological satellite, on 10 May 1999 from the Taiyuan

Launch Complex, located in Shanxi province. Since 1985 that complex has served as a launch point for polar-orbiting satellites, primarily of the Earth monitoring, science, and meteorological type.¹² Feng Yun-1C was in sun-synchronous orbit ranging between 845 and 865 kilometers above Earth, with an inclination of approximately 99 degrees.¹³ Comparable American satellites include the defense meteorological satellites and the National

The world will continue to feel the consequences of this action for decades. Specifically, the intercept produced a massive debris field estimated at 20,000 to 40,000 fragments, each of them one centimeter or greater in size.¹⁵ This single event resulted in a 20 percent increase in the number of trackable objects in low Earth orbit (LEO). Because the interception was coplanar, much of the debris field resides in close proximity to the

The intercept produced a massive debris field estimated at 20,000 to 40,000 fragments. . . . These fragments pose a significant threat to satellites from many nations.

Oceanic and Atmospheric Administration's polar-orbiting satellites.

A kinetic-kill vehicle launched by a modified DF-21 intermediate-range ballistic missile known as the KT-1 space-launch vehicle, in essence a modified DF-21, destroyed Feng Yun-1C.¹⁴ The exact technical characteristics and specific capabilities of the missile are not publicly known and are probably unique. Expert review of available information and testimony from civilian monitors and modelers indicate that the missile carried a kinetic-kill vehicle of approximately 600 kilograms.

A simplistic evaluation of the kinetic energy provides some insight into the level of effectiveness of the kill. Given the mass of the Feng Yun-1C at 880 kilograms, an estimated kinetic-kill-vehicle mass of 600 kilograms and closure speed of 32,400 kilometers per hour yield a maximum kinetic energy of approximately 40.9 gigajoules. To put this into perspective, one ton of standard TNT explosives yields approximately 4.184 gigajoules of kinetic energy. Thus, the combined kinetic energy of the satellite and interceptor amounts to approximately nine times the explosive yield of one ton of TNT.

original altitude of the Feng Yun-1C at the time of the interception; however, some fragments may be as high as 3,500 kilometers in orbit.¹⁶

These fragments pose a significant threat to satellites from many nations. A review of the database maintained by the Union of Concerned Scientists indicates well over 50 satellites in LEO near the altitude of the debris field from Feng Yun-1C. A further review reveals 16 satellites with an apogee/perigee within 825 to 900 kilometers and an inclination angle of 98 to 99 degrees (table 1).

The threat from the debris is not limited to any single satellite. With velocities in the range of eight kilometers per second, debris colliding with any of these 16 satellites could have a dramatic cascading effect, leading to uncontrollable and/or inoperable satellites threatening other satellites in nearby orbits and dramatically increasing the amount of hazardous debris in LEO, as recently occurred with the collision between Iridium and Russian military satellites. Additionally, the Union of Concerned Scientists' satellite database lists a number of satellites that pass through the debris field's altitude during their Molnyia (highly elliptical) orbits. Given the na-

Table 1. Threatened satellites

<i>Name of Satellite, Alternate Names</i>	<i>Country of Operator/ Owner</i>	<i>Users</i>	<i>Purpose</i>	<i>Perigee (km)</i>	<i>Apogee (km)</i>	<i>Inclination (degrees)</i>
IRS-P6	India	Gov't	Remote sensing	802	875	98.7
Met Op-A Met Op Sat	Multinational	Gov't/Civil	Earth Science / Meteorology	813	830	98.73
Cute-1 Cubical Titech Eng Sat, Oscar 55	Japan	Civil	Technology Development	819	831	98.7
Cubesat XI-IV Oscar 57	Japan	Civil	Technology Development	822	828	98.7
Spot 2	France/Belgium/Sweden	Comm	Earth Observation	824	825	98.7
Spot 4	France/Belgium/Sweden	Comm	Earth Observation	824	825	98.7
Feng Yun-3A (FY-3A)	China (PR)	Gov't	Earth Science	825	829	98.8
MOST	Canada	Civil	Astrophysics	831	855	98.7
DMSP 5D-3 F15, USA 147	USA	Military	Earth Science / Meteorology	837	851	98.9
DMSP 5D-2 F14, USA 131	USA	Military	Earth Science / Meteorology	842	855	98.9
DMSP 5D-3 F17, USA 191	USA	Military	Earth Science / Meteorology	842	855	98.79
DMSP 5D-3 F16, USA 172	USA	Military	Earth Science / Meteorology	843	852	98.9
DMSP 5D-2 F13, USA 109	USA	Military	Earth Science / Meteorology	845	855	98.8
NOAA-18 (NOAA-N, COSPAS-SARSAT)	USA	Gov't	Meteorology	847	866	98.7
NOAA-16 (NOAA-L)	USA	Gov't	Earth Science / Meteorology	848	863	98.7
Feng Yun-1D (FY-1D)	China (PR)	Gov't	Earth Science	851	871	98.8

Source: "UCS Satellite Database," Union of Concerned Scientists, 6 October 2008, http://www.ucsusa.org/nuclear_weapons_and_global_security/space_weapons/technical_issues/ucs-satellite-database.html.

ture of such orbits and the associated increase in speed while at perigee, these satellites would hit the debris at a higher speed, with catastrophic results. Under the Convention on International Liability for Damage Caused by Space Objects, China may be accountable if such an incident were to occur.¹⁷

China's ability to strike a relatively small satellite with a kinetic-kill vehicle at a significant altitude clearly demonstrates technological prowess. What could motivate such a dramatic action? Kenneth S. Blazejewski proposes several possible interpretations of Chinese space-weapons activity. First, it signals a strong concern regarding the United States' continuing development of a ballistic missile defense shield and that country's possible weaponization of space. He points to the leveraging effect that such a system could impose on Chinese missiles in the event of an attack on Taiwan. Blazejewski further states that

such an obvious ASAT test, in Chinese eyes, could lead to a negotiation to de-weaponize space. Alternatively, as James Oberg stipulates, destruction of the Feng Yun might encourage the US Congress to sign a treaty banning the use of ASAT weapons, which would clearly follow Chinese strategy of employing an asymmetric approach to negate a US advantage.¹⁸ Second, according to Blazejewski, China may perceive that the United States seeks to deny it the use of space and is therefore pursuing ASAT capabilities to meet that challenge. Third, he suggests that China simply seeks to establish parity with US and Russian ASAT capabilities.¹⁹

US Destruction of USA-193

In January 2008, the United States began public planning for a similar ASAT test that would target a failing National

Reconnaissance Office (NRO) satellite (USA-193). (See table 2 for a comparison of this satellite and the Feng Yun-1C.) Conducted under the auspices of the Missile Defense Agency, the test used readily available systems, modified in rapid fashion to provide a seaborne satellite-intercept capability. The more open nature of American society, the preannounced intentions of this ASAT test, and the media focus made a good bit of information available; however, many details remain classified.

bated about which agency within the department could best carry out the ASAT mission. The Missile Defense Agency's expertise and previous experience made it the logical choice. That agency's senior leadership concluded that the test community within the organization had the disciplined approach necessary to conduct such an operation.²¹ Because the primary aiming point was the main hydrazine tank, which weighed 450 kilograms, targeting of USA-193 would center on that portion of the satellite.²²

Table 2. Satellite comparison

<i>Satellite Characteristics</i>	<i>United States USA-193</i>	<i>China Feng Yun-1C</i>
Satellite Type	Reconnaissance	Meteorological
Satellite Mass	2,450 kg	880 kg
Satellite Apoapsis	257 km	865 km
Satellite Periapsis	242 km	845 km
Satellite Inclination	58.48 degrees	98.8 degrees

Source: "FY-1," *Encyclopedia Astronautica*, <http://www.astronautix.com/craft/fy1.htm> (accessed 11 November 2008); and David A. Fulghum and Amy Butler, "U.S. to Shoot Down Satellite," *Aviation Week*, 17 February 2008, http://www.aviationweek.com/aw/generic/story_generic.jsp?channel=awst&id=news/aw021808p2.xml&headline=U.S.%20To%20Shoot%20Down%20Satellite (accessed 30 October 2008).

The Air Force launched NRO satellite USA-193 on 14 December 2008 from Vandenberg AFB, California. The 21st in the NRO series and most likely carrying very-high-resolution photo-imaging systems, the satellite failed after one day in a deteriorating polar orbit ranging between 257 and 242 kilometers. Because the satellite retained a significant amount of hydrazine fuel—a highly reactive and toxic chemical, exposure to which can be extremely hazardous—that could possibly survive reentry, the US government announced that it would shoot down the 2,450-kilogram USA-193, destroying the hydrazine fuel tank in the process, before it could plummet to Earth and possibly cause fatalities.²⁰

After finalizing the decision to conduct the shoot-down, senior leadership within the Department of Defense de-

The intercept would employ a modified Standard Missile-3 (SM-3) fired from the Aegis-system-equipped USS *Lake Erie*, one of three such cruisers in the US Navy that carry the SM-3 and part of the sea-based Aegis ballistic missile defense system.²³ These warships are designed to provide midcourse-intercept capabilities against short- and intermediate-range ballistic missiles.²⁴

The SM-3's kinetic warhead, which uses a high-resolution long-wave-infrared sensor for target detection, is vectored into intercept by the Solid Divert and Attitude Control System.²⁵ The warhead incorporates advances from earlier designs, including a large-aperture field of view that enables target acquisition at 300 kilometers. Additionally, data-stream encryption ensures secure communica-

tions and telemetry supporting confirmation of missile performance.²⁶

For the shoot-down of USA-193, modifications to the USS *Lake Erie*'s systems included the AN/SPY-1 radar system and SM-3 missiles, the former tasked to report the satellite as engageable, identify it as a valid target, determine intercept points, and provide revised aiming-point information.²⁷ In an effort to maximize successful target engagement, the Missile Defense Agency's team augmented Aegis tracking by integrating data from the US space-surveillance network, in-

shot when the sun angle would maximize optical tracking. The shoot-down of USA-193, which included each military service, offered a good indication of the level of jointness within the Department of Defense.²⁹

Comparisons

Both the American and Chinese ASAT missions relied upon kinetic-kill vehicles. The absence of either a conventional or nuclear warhead reflects the significantly improved accuracy and precision of to-

Tremendous political pressure sought to ensure that the mission went as projected during planning for the shoot-down . . . minimizing the debris field.

cluding X-band radars and other Aegis radar systems. Tracking data from these sources enhanced situational awareness, provided precision data, and created a real-time, accurate track-enabling computation of a firing solution.²⁸

Tremendous political pressure sought to ensure that the mission went as projected during planning for the shoot-down, a significant portion of that pressure focusing on minimizing the debris field since the US intercept would yield a kinetic energy greater than that for the Chinese intercept. (The mass of USA-193, estimated as 2,450 kilograms, combined with a closure speed of intercept of 28,000 kilometers per hour yields a maximum estimated kinetic energy of 74.2 gigajoules—approximately 17 times greater than the explosive yield of one ton of TNT.) Meaningful debate within the team emphasized limiting any possible secondary effects following a successful intercept (e.g., an errant, dysfunctional satellite or an underforecasted debris field). Therefore, the team included a plan to mitigate these factors by taking such actions as conducting the

day's systems compared to those proposed in the early part of the Cold War. The use of a kinetic kill mitigates the danger of damage to friendly satellites caused by electromagnetic pulse—a crucial difference, given the fact that we have many more satellites today than we did 30 years ago. Other similarities between the ASAT tests include the use of solid-fueled boosters and mobile launch platforms. (Although capable of mobile launch, the Chinese mission probably launched from a fixed position.)

Several notable differences distinguished the ASAT missions as well—for example, the altitudes of the satellites. Only a few days away from reentry into the atmosphere and potential impact with the surface, USA-193 orbited at a relatively low 247 kilometers at the time of its destruction, whereas Feng Yun-1C orbited at the significantly higher altitude of 864 kilometers. This 617-kilometer difference is important because of the time that the residual debris field will remain in orbit, posing a threat to other satellites. According to Geoffrey Forden, even residual segments from the USA-193 in-

tercept that acquired a greater speed due to the collision will have an orbital perigee of 210 kilometers and should degrade in altitude, burning up in reentry far more rapidly than the remnants of Feng Yun-1C.³⁰ Estimates for the debris from USA-193 indicate no remaining pieces in orbit after 40 days; meanwhile, modeling suggests that debris from Feng Yun may stay in orbit for up to 100 years.³¹

In an interview prior to the USA-193 shoot-down, Gen James Cartwright (USMC), vice-chairman of the Joint Chiefs of Staff, avowed that the US test launch differed from the Chinese launch, pointing out that the United States was providing the world advance notification of its launch and that the US intercept would occur at a very low orbital altitude to assure that no residual debris remained in long-term orbit.³² This difference in altitude also drove the size of the launch vehicle. Given the estimated six times greater mass of the Chinese kinetic-kill vehicle and the higher altitude, the DF-21/KT-1 had a launch mass 20 times

greater than that of the SM-3. Furthermore, the US missile relied upon the global positioning system (GPS) and inertial navigation system with radar guidance, whereas the DF-21/KT-1 employed an inertial navigation system with terminal radar guidance (table 3).

Mitigating the Antisatellite Threat

During a speech at the 2007 Air Warfare Symposium, Secretary of the Air Force Michael Wynne stated that “space is no longer a sanctuary.”³³ These remarks underscored the fact that China had demonstrated its ability to strike US satellites and that several other countries possessed or were seeking similar capabilities. In light of the potential threat posed by ASAT systems, how can the United States mitigate or reduce it? In his paper *Does the United States Need Space-Based Weapons?* Maj William L. Spacy gives some indication of how such

Table 3. Comparison of missile-intercept systems

	<i>United States SM-3</i>	<i>Chinese Deng Fong-21</i>
Length	6.55 m	10.7 m
Diameter	0.34 m	1.4 m
Launch mass	708 kg	14,700 kg
Estimated kinetic vehicle mass	102 kg	600 kg
Configuration	Three-stage solid propellant	Two-stage solid propellant
Guidance	GPS/INS and radar guidance	Inertial plus terminal radar guidance
Interceptor / Target Closing Speed	28,000 km*hr ⁻¹	32,400 km*hr ⁻¹
Interceptor Launch (Ground/Sea)	Shipborne	Ground based
Interceptor Launch Point (estimated)	163.3 degrees West, 23.5 degrees North	102.0 degrees East, 28.2 degrees North
Interceptor Launch Facility	USS <i>Lake Erie</i>	Xichang Space Center
Interceptor Type	Modified Standard Missile-3	Modified Dong Feng-21 / KT-1 Space-Lift Vehicle
Estimated Debris Pieces in Orbit	None after 40 days	2,200 (for 20–100 years)
Intercept Altitude	247 km	864 km

Source: Geoff Forden, “A Preliminary Analysis of the Chinese ASAT Test,” 9, <http://web.mit.edu/stgs/pdfs/A%20Preliminary%20Analysis%20of%20the%20Chinese%20ASAT%20Test%20handout.pdf> (accessed 1 November 2008); and Geoffrey Forden, “A Preliminary Analysis of the USA-193 Shoot-Down,” 12 March 2008, http://mit.edu/stgs/pdfs/Forden_Preliminary_analysis_USA_193_Shoot_down.pdf (accessed 14 November 2008).

counter-ASAT systems might work, highlighting three potential methods: bodyguard satellites, ground-based directed-energy weapons, and space-based anti-ASAT missiles.³⁴

Assigned to high-value satellites, bodyguard satellites would place themselves between the protected satellite and the attacking weapon system, thus performing much the same service for other satellites as fighter escorts did for bombers in World War II (i.e., providing both active and passive defense).³⁵ Bodyguard satellites would need some autonomy in order to discern when an attack is imminent and take protective measures to maneuver into the correct position. Ground-based directed-energy weapons could

maneuver capacity coupled with sensors capable of detecting approaching hostile bodies will enable critical satellites to evade attacking bodies or debris fields; therefore, designs for such satellites should include robust and sustainable thrust capability.

Moreover, building such satellites with separate, redundant systems would increase their ability to function after attack. A similar and potentially more resilient approach involves the use of clustered satellite constellations, which could be widely dispersed or could orbit in close proximity.

The Defense Advanced Research Projects Agency recently proposed designing and fielding satellites that are serviceable

Methods for improving satellites' chances of surviving both natural and man-made hazards include the ability to track threats, add redundancy, and develop serviceable systems.

intercept attacking direct-ascent, kinetic-energy weapons/missiles, rendering them ineffective prior to their reaching friendly satellites. Due to their fixed position on the planet, these counter-ASAT weapons would have an inherently limited line-of-sight striking range. However, by possessing nearly instantaneous striking capability, they would prove very timely if called upon. Lastly, space-based anti-ASAT platforms or kinetic-kill systems, more technologically feasible than surface-based directed-energy weapons, would intercept an attacking ASAT system and destroy it prior to its reaching the targeted satellite.

Methods for improving satellites' chances of surviving both natural and man-made hazards include the ability to track threats, add redundancy, and develop serviceable systems.³⁶ Enhancing the United States' ability to track satellites and significant debris represents the first step in avoiding dangers. Extended

while in orbit. In March 2007, the agency launched Orbital Express—an advanced technology demonstration system consisting of the Autonomous Space Transport Robotic Operations (ASTRO) prototype servicing satellite and the NextSat, a serviceable next-generation satellite designed to serve as a surrogate to ASTRO. Equipped with a robotic arm, ASTRO is designed to evaluate the feasibility of autonomously refueling satellites and robotically changing their components in orbit.³⁷ Successful testing of Orbital Express will decrease current service-life restrictions on satellites based on fuel availability. In addition, the ability to replace components will enable a return to service for satellites damaged by hostile action.

Other means of protecting satellites include enhanced situational awareness, employment of stealth/radar-absorbing technologies, and better design techniques.³⁸ Differentiating between man-

made and natural threats, such as purposeful directed-energy attacks and secondary effects from solar storms, is crucial in ascertaining whether an actual attack is in progress. Additionally, if a hostile force attacks a satellite, determining the source of the attack and taking evasive action or counterattacking are time critical. Multiple satellites working in concert to determine the source and nature of any satellite attack will provide operators the level of enhanced awareness to enable decision makers to act quickly and appropriately in response to threats.³⁹

Given the costs of launching satellites into orbit, present satellite design has focused on squeezing the most utility out of each kilogram, and very little thought has gone into applying stealth technologies to satellites. Exploiting current radar-absorbing technology by incorporating such materials onto sensitive satellites could produce a successful passive defense. Research into active “cloaking” technologies shows promise in hiding satellites—enabling them to better blend into their background. Integration of these technologies into smaller satellites would decrease their vulnerability by making them harder to detect and strike.

Yet another means of increasing the survivability of satellites involves using appropriate geometry in design efforts—applying the proper shaping to diminish exposed satellite surfaces. Reducing the effective head-on surface area would lessen the probability of penetration; moreover, it would serve as a deflecting mechanism, similar to techniques used in the design of main battle tanks.

Any nation with the space-lift capability to place the necessary payload into LEO could theoretically field a rudimentary ASAT program based upon high-explosive warheads or small nuclear warheads. The dual use of civilian and military rockets being developed and placed into operation by several countries (e.g., Israel, Iran, North Korea, and India) opens the door to rapid growth in

the number of potential players in the weaponization of space.

Primary among the Asian countries is China, a proven player in the ASAT arena. China's growing manned space program—witness its recent success with the *Shenzhou* spacecraft—reflects its confidence and technological capabilities.⁴⁰ The pursuit of Chinese unmanned lunar missions, constellations of communications satellites, and plans for a navigational satellite constellation offer further evidence of a developing command and control capability. This series of successes and technological advances fires a sense of national pride and a desire to assert a Chinese presence in space. As China's dependence on satellites grows, so will its vulnerability, forcing senior leaders to pursue a more robust ASAT capability or abandon such efforts entirely. The latter seems unlikely since China considers space one of its five warfare domains.⁴¹

Second to China in Asian space capability is Japan. Though not a nuclear-armed country, Japan has a demonstrated ability to launch satellites and the technological means to field a viable interceptor. In 2007 that country also launched *Kaguya*, its first lunar probe, using its self-produced H-2A rocket, which has lifted payloads weighing over four tons and has placed satellites into orbits well beyond LEO.⁴²

In addition, Japan is a primary partner in the development of the SM-3/Aegis system. It has cooperated recently with the US Missile Defense Agency to design and test the advanced nose cone for the antiballistic missile. The Japanese Defense Force has fielded the SM-3 on its *Kongo*-class warships and has purchased Patriot Advanced Capability-3 antiballistic missiles for stationing on the home islands.⁴³ Clearly, Japan has the technical expertise and operational experience to quickly implement an ASAT system.

India, another country with a growing organic space-launch capability, so far has launched 10 satellites with its Polar

Satellite Launch Vehicle and seeks to produce its Geosynchronous Satellite Launch Vehicle by 2012. This will give India the capacity to place 3.5-ton payloads into geosynchronous orbit.⁴⁴ India also possesses nuclear-capable ballistic missiles, giving it a de facto ASAT capability. Considering India's rivalry with China and the latter's growing use of satellites, ASAT capabilities may suit Indian strategy. Other Asian countries pursuing space-lift capabilities include, primarily, South Korea, as well as Vietnam, Malaysia, Singapore, and Taiwan.⁴⁵

Conclusion

The Cold War saw the development, testing, and fielding of rudimentary ASAT capabilities, leading to the cementing of a space policy in treaties and agreements that forbade weapons of

mass destruction. With its growing economic power and force modernization (including doctrinal changes), China has sought to leverage asymmetrical means of military power projection, including depriving technology-dependent military forces the use of satellites. China clearly demonstrated this asymmetrical capability when it shot down the Feng Yun-1C satellite. Is it possible that the recent Chinese and American ASAT missions mark the beginning of a second space race, this time with a more sinister and destructive component? As more nations join the ranks of the ASAT-capable countries, survivability must be designed into those satellites critical to national security. Designing and building satellites for the future can be accomplished only through a robust test and development program, with emphasis on reducing vulnerability. ☆

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Lt Col James Mackey

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Team Spirit

A Case Study on the Value of Military Exercises as a Show of Force in the Aftermath of Combat Operations

Dr. John F. Farrell



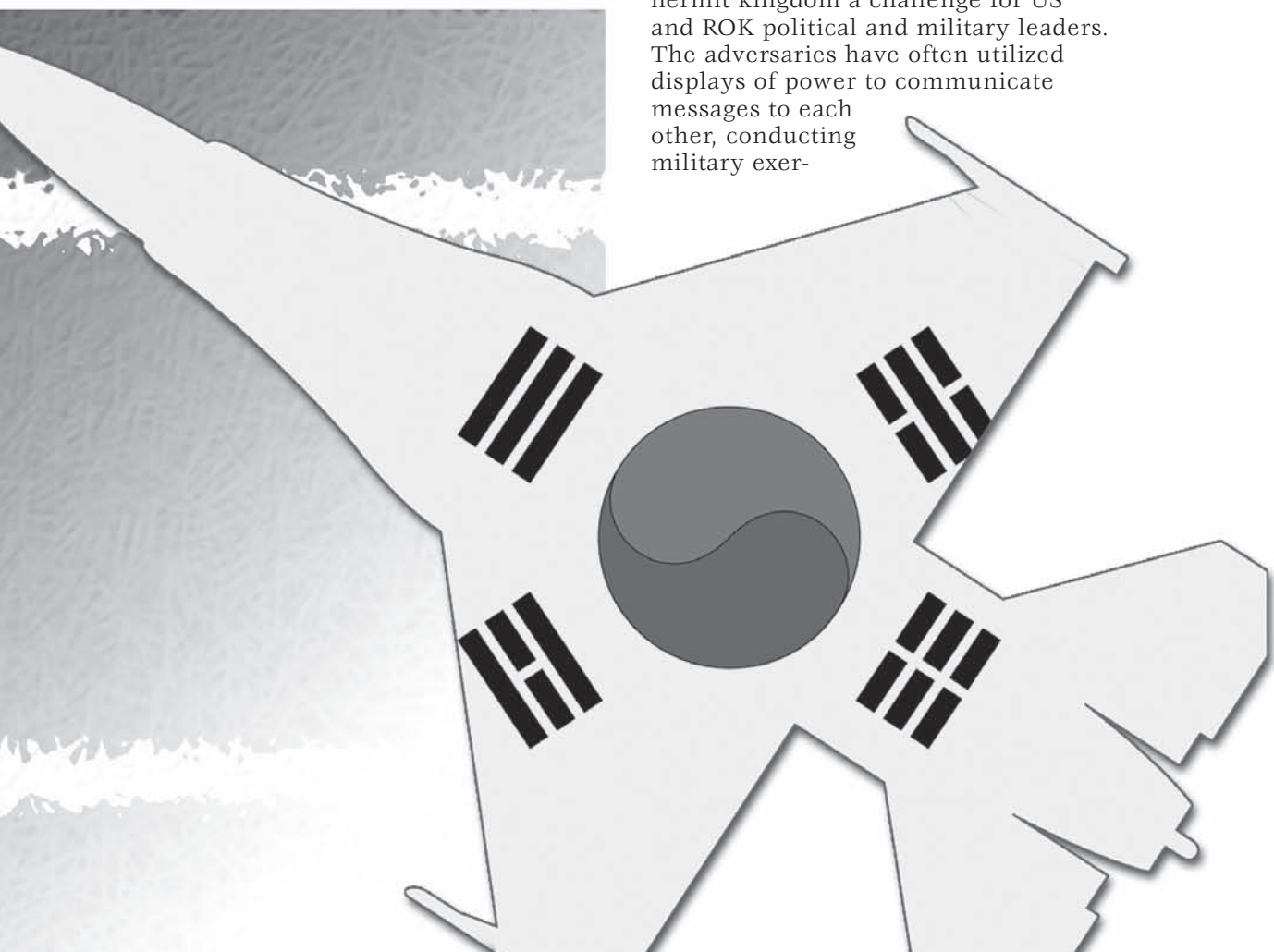
Political concerns dominate a show of force operation, and as such, military forces often are under significant legal and political constraints. The military force coordinates its operations with the country teams affected. A show of force can involve a wide range of military forces including joint US military or multinational forces. Additionally, a show of force may include or transition to joint or multinational exercises.

—Joint Publication 3-0, *Joint Operations*,
17 September 2006

Although an armistice ending combat operations was signed on 27 July 1953, no formal peace treaty ever concluded the Korean War. Consequently, the Democratic People's Republic of Korea (DPRK) technically has remained at war with the Republic of

Korea (ROK) and the United States for well over half a century. Skirmishes between the two sides have erupted periodically, but no major combat has taken place since the cease-fire.

This uneasy peace that has settled over the land of the morning calm has made dealing with the North Korean hermit kingdom a challenge for US and ROK political and military leaders. The adversaries have often utilized displays of power to communicate messages to each other, conducting military exer-



cises to demonstrate political and military resolve.

Commanders have long valued the efficacy of exercises. In World War II, Army leaders benefited from the Louisiana maneuvers. REFORGER exercises during the Cold War ensured the capability of US forces to deploy to Europe. Modern exercises at the national and joint readiness training centers, as well as the simulated air wars of the Air Warrior and Flag exercises, have proven invaluable in preparing forces for conflict. Short of actual combat, realistic training exercises are considered the best vehicles to prepare armed forces for war.

Military exercises, however, can have value beyond the obvious benefit of readying troops for battle. Just as Carl von Clausewitz postulated that opponents wage war for political purposes, so can the preparation for war have value in the political realm. Such was the case with Team Spirit, an annual combined exercise held in the ROK. Born during a time of political controversy in the 1970s, this exercise, directed by the Joint Chiefs of Staff, took on a life of its own as it became an effective tool for the United States when negotiating with both South and North Korea. Now dormant, Team Spirit nevertheless serves to further US and ROK political aims on the Korean peninsula, especially in ensuring that North Korea lives up to its nuclear treaty obligations. Skillfully employed, military exercises such as Team Spirit can serve as a show of force to extract concessions from adversaries without having to resort to direct military intervention.

Evolution of Team Spirit

The United States and ROK originally designed Team Spirit with both military and political objectives, agreeing during the annual Security Consultative Meeting in 1975 to consolidate several

smaller exercises conducted since 1969 into a comprehensive field-maneuver exercise held each spring.¹ During the first exercise, held in 1976, America sought to demonstrate to North Korea its commitment to the ROK, as well as give troops realistic training in combined military operations.

However, Team Spirit soon generated more profound political ramifications than originally envisioned. Though not created with 1976's election of Jimmy Carter in mind, the exercise proved somewhat serendipitous to the new American president's administration. Since January 1975, Carter had been promising that if elected he would withdraw the nearly 40,000 American troops from South Korea. After his inauguration in early 1977, he seemed committed to carrying out his campaign pledge.² Holding a major military exercise annually in the face of proposed troop withdrawals would serve to convince the South and North Koreans that America remained committed to the ROK's defense. Michael Armacost, a member of Carter's National Security Council, stated in a classified memorandum of 1977 that Team Spirit "is a large exercise, but is consistent with the guidance that exercises in Korea shall be larger, more frequent *and* more visible during our ground troop withdrawals" (emphasis in original).³ To enhance that visibility, over 300 reporters were invited to cover Team Spirit 78, the first time the media had access to the exercise. Deputy Secretary of Defense Charles W. Duncan referred to Team Spirit 78 as "a clear demonstration of our ability to rapidly augment forces in Korea."⁴ Resistance to Carter's policy soon forced him to postpone and eventually reverse his decision to withdraw American forces, but Team Spirit continued to grow in numbers and significance.

Almost immediately, it became US Pacific Command's largest exercise, with 107,000 ROK and US personnel partici-

pating in 1978.⁵ That number increased to 168,000 for Team Spirit 79.⁶ Total participation dropped to 145,000 in 1980 due to funding and “real-world activities,” but it climbed to 156,700 the next year.⁷ Team Spirit 82 saw an increase to over 167,000 participants, and the exercise continued to expand, as Team Spirit 83 boasted 192,000 personnel.⁸ With over 200,000 personnel participating in 1986, 1988, and 1989, Team Spirit became the free world’s largest military exercise until the 1990s, when the size and scope of the exercise began to draw down.⁹ In 1991 Operation Desert Storm forced a significant scaling down, restricting Team Spirit to largely in-country forces.¹⁰ When it resumed in 1993 after a cancellation the previous year, only 19,000 personnel reinforced US and Korean forces, for a total participation of 120,000 troops.¹¹ The 1993 exercise marked the last year Team Spirit was held.

North Korean Reaction to Team Spirit

Judging by the reaction of the North Koreans, one could argue that Team Spirit represented a potent show of force because DPRK resistance to it grew as the exercise expanded. Kim Il Sung, the president of North Korea, believed that Carter’s promise to withdraw US forces from South Korea was genuine and presented an opportunity for rapprochement between North Korea and the United States. However, Kim soon grew increasingly frustrated at Carter’s delay in the withdrawal, seeing the initiation and expansion of Team Spirit as a further revision of the American president’s stated policy. Although no evidence of a direct connection exists, the first Team Spirit may have contributed to the tension that resulted in the slaying of two American officers by North Korean guards at Panmunjom on 18 August 1976.¹² Otherwise, the DPRK’s annual

protests to the exercise were limited to propaganda statements from state-run media.¹³ Reports coming from the official DPRK news agency, however, indicate that the North Koreans’ alarm grew precipitously prior to the start of the 1983 exercise.¹⁴ Team Spirit definitely had their attention.

Although the United States billed Team Spirit as a completely defensive exercise, the North Koreans contended that it prepared for an invasion of the North. They had always considered Team Spirit a nuclear-war exercise, a charge somewhat validated by the introduction of B-52 nuclear bombers in 1977 and nuclear-capable Lance long-range missile systems a year later.¹⁵ In their minds, they had ample cause to be wary. After all, prior to their invasion of the South in 1950, DPRK forces used military maneuvers to mask troop movements.¹⁶ Prof. Andrew Mack of the Australian National University challenges us to consider how the United States and ROK might have reacted had the shoe been on the other foot:

How would the South have felt if during the 1980s the Soviets had 44,000 military personnel and advanced military equipment (including nuclear weapons) based in the North, while there were no American troops or nuclear weapons in the South? Imagine further that the Soviets and the DPRK ran an annual 200,000-strong joint exercise involving nuclear-capable ships and aircraft, and that the exercise was unambiguously intended as training for a major war with the South. It is not surprising that the North finds Team Spirit threatening.¹⁷

The North had a major problem with Team Spirit, feeling that it had no choice other than put DPRK forces on alert for the duration of the exercise. In a speech to the Supreme People’s Assembly, Ho Tam, chairman of the Committee for Peaceful Reunification of the Fatherland and a member of the Korean Workers’ Party, explained that military forces in the North went on a “war foot-

ing” for the first time in 1983 because Team Spirit was such a large exercise involving the use of dangerous weaponry.¹⁸ Subsequently, putting forces on alert in North Korea for Team Spirit became a yearly ritual. Kim Il Sung told East German president Erich Honecker in 1984 that “every time the opponent carries out such a maneuver, we must take counteractions.”¹⁹ Indeed, a North Korean defector reported that DPRK soldiers, normally not issued live ammunition for fear of a military coup, carried bullets during these alerts.²⁰ The North felt that it had to forward-deploy troops lest its long supply lines become vulnerable to the threat of air interdiction should hostilities commence. Gen James Clapper Jr., director of the Defense Intelligence Agency from 1991 to 1994, identified that vulnerability as the reason the North Koreans “go nuts at Team Spirit.”²¹ Placing an entire nation on a “semi-war footing” also proved expensive, especially with the collapse of the North’s chief benefactor, the Soviet Union. North Korea had to move several military units, ground equipment, and aircraft during a time of severe fuel shortages. According to Kim, his call-up of reservists to augment regular troops cost “one and a half months of working shifts . . . a great loss.”²² Members of the general population also dug themselves bomb shelters and were subject to mandatory participation in anti-American rallies, air-raid drills, curfews, and imposed blackouts. One Westerner living in Pyongyang described his somewhat humorous experience of being caught outside in a spotlight during his first Team Spirit blackout: “I waited for a shouted order, the sound of a rifle being cocked. Instead, I heard a giggle, and then another. I squinted, and just about made out two female forms, dressed in baggy military uniforms and soft Mao caps.”²³

The North’s animosity toward the exercise became almost visceral. Kim Il Sung’s voice reportedly “quivered” and

his hands “shook with anger” when discussing Team Spirit with New York congressman Gary Ackerman during the latter’s official visit to Pyongyang in 1993.²⁴ The resumption of Team Spirit in 1993 was particularly galling to Kim Jong Il, Kim Il Sung’s son, who then served as supreme commander of the armed forces. He had taken personal credit for the cancellation of the previous year’s exercise, thus sparing his people the annual ordeal of putting the nation on alert. Resumption of the exercise might suggest failure on his part at a time when he was trying to consolidate his position as the heir apparent.²⁵ Additionally, Kim Il Sung was in poor health in 1993, and many people doubted Kim Jong Il’s ability to hold the regime together, particularly during threatening military maneuvers in the South.²⁶ Some even conjectured that North Korean military leaders might use military maneuvers in response to Team Spirit as a cover for a coup d’etat.²⁷ Hence, it was clearly in the DPRK leadership’s interest to seek the elimination of this exercise.

Team Spirit: The Carrot and the Stick

By 1985 the DPRK’s economic and foreign-policy decisions indicated just how much Team Spirit had become a thorn in its side. In protest of the exercise, the North Koreans suspended trade talks with the South and negotiations with the Red Cross in January.²⁸ The North claimed that Vice Premier Kim Hwan had tried to meet with a South Korean deputy minister to discuss the issue.²⁹ The North agreed to resume talks in April following completion of Team Spirit, repeating this move in January 1986 but then insisting on the end of the exercise prior to the resumption of talks.³⁰ Attempts at reunification through interparliamentary talks ended in February 1989 when the North ceased all meetings in protest of that year’s

Team Spirit. Again, the North Koreans suspended all inter-Korean talks in February 1990, as well as scheduled prime-ministerial talks in February 1991, due to the exercise.³¹

Team Spirit played a pivotal role in nuclear negotiations. Fearing that North Korea was embarking on the development of nuclear weapons, the United States persuaded the Soviet Union to convince the DPRK to sign the Nuclear Non-Proliferation Treaty (NPT) on 12 December 1985 in exchange for four Soviet-supplied light-water nuclear reactors to ease its energy shortage. The NPT required the North to admit inspectors from the International Atomic Energy Agency although the North never signed the subsequent safeguards agreement permitting the inspections. After the United States offered the cancellation of Team Spirit as an inducement, the North signed a joint nonnuclear declaration with the South on 31 December 1991, agreeing to use nuclear power only for peaceful purposes.³² According to the declaration, "South and North Korea shall conduct inspections of particular subjects chosen by the other side and agreed upon between the two sides."³³ In a joint news conference with South Korean president Roh Tae Woo in Seoul on 6 January 1992, Pres. George H. W. Bush stated that if North Korea "fulfills its obligation and takes steps to implement the inspection agreements, then President Roh and I are prepared to forego the Team Spirit exercise for this year."³⁴ South Korea officially announced the cancellation of the exercise the next day.³⁵ The ROK Defense Ministry cautioned, however, that if the North intended to use "intra-Korean accords to play political games, without any real interest in implementing them, Team Spirit exercises can be resumed at any time."³⁶ Team Spirit had served its purpose as a carrot to negotiations with the North, as well as a po-

tential stick should the North renege on the agreement.

Team Spirit's role as a stick came into play the next year. As North Korean intransigence on the issue of inspections dragged on throughout 1992, both the US and ROK defense ministers announced in October that planning for Team Spirit 93 would commence.³⁷ The South offered to cancel the exercise only if the North adopted guidelines for inspections by November and if the first inspection began by 20 December. The two countries could not reach an agreement, so the South announced on 25 January 1993 that Team Spirit would take place that year. Not wanting to alienate their military constituencies after just taking office, both South Korean president Kim Young Sam and US president Bill Clinton allowed the exercise to proceed.³⁸ In response, on 12 March the DPRK announced its withdrawal from the NPT effective 12 June, after the treaty's prescribed three-month waiting period.³⁹

Team Spirit then switched back from the stick to the carrot. During Team Spirit 93, the South indicated on 27 March that it would consider a permanent cancellation of future Team Spirit exercises if the North reversed its decision to withdraw from the NPT.⁴⁰ The North Koreans suspended their withdrawal on 11 June after meeting with US negotiators. Despite the lack of any formal mention of Team Spirit, the parties had an implicit understanding that compliance would result in no further exercises.⁴¹

Continued resistance by the North to allowing inspections throughout the remainder of 1993 and into early 1994 led to the South's again using Team Spirit as a cudgel. On 31 January 1994, the ROK declared that it would proceed with Team Spirit 94 if the North did not allow nuclear inspections.⁴² In response, the DPRK repeated its threat to pull out of the NPT. Consequently, the Pentagon began preparing for Team Spirit deploy-

ments.⁴³ In early February, Seoul's Defense Ministry scheduled the beginning of Team Spirit for 22 March.⁴⁴ Then, in accordance with an Agreed Conclusion negotiated on 25 February, the North would admit inspectors if South Korea cancelled Team Spirit 94.⁴⁵ When North Korea later denied them access, the inspectors were ordered home on 15 March. Even though it was too late to hold Team Spirit during its normal time in March, the US military began consulting with Seoul over rescheduling the exercise later in the year.⁴⁶ One possibility called for combining Team Spirit with August's command-post exercise, known as Ulchi Focus Lens, to make "one helluva [*sic*] big exercise."⁴⁷ When the North Koreans walked out of talks on 19 March, an interviewer asked Warren Christopher, the US secretary of state, whether holding Team Spirit was inevitable. "Yes," he replied, "it's a matter of timing."⁴⁸ After months of negotiations dragged on, punctuated by the visit of former president Jimmy Carter to North Korea and the death of Kim Il Sung, ROK president Kim announced on 11 October that his government had decided "to go ahead with Team Spirit military exercises next month unless the North shows sincerity to resolve the nuclear problem."⁴⁹ Finally, on 21 October, in accordance with an Agreed Framework signed by the United States and North Korea in Geneva, Switzerland, the North agreed to dismantle its existing nuclear facilities and comply with the International Atomic Energy Agency in exchange for light-water reactors and other economic aid. Based on this agreement, the United States cancelled Team Spirit for 1994.⁵⁰ As of this writing, it has not been held again.

Although Team Spirit had proven an efficacious negotiating tool, several supporters did not want the exercise sacrificed on the altar of nuclear compliance. Individuals in the ROK government later saw the advantage of using Team Spirit as a bargaining chip during nu-

clear negotiations, but prior to 1991 the ROK government and military viewed the exercise as invaluable in maintaining military readiness and conducting a show of force against the North. Hence, the United States was not about to cancel an exercise demonstrating its commitment to the ROK without the concurrence of the South Korean government. When a Clinton administration proposal to cancel Team Spirit 94 in exchange for nuclear inspections of DPRK facilities leaked to the press in November 1993, Kim Young Sam, during his first official visit to Washington, voiced his displeasure in the Oval Office at America's not including his government in the decision process and declared that he—not the Americans—would make the final decision as to the disposition of Team Spirit. The White House agreed that Kim would make any announcement concerning the future of the exercise.⁵¹ Several Americans also opposed cancelling Team Spirit. Columnist Charles Krauthammer described it as "the foremost symbolic expression of America's commitment—a solemn, binding treaty commitment—to the defense of South Korea."⁵² Former secretary of defense Caspar Weinberger also objected to the cancellation of the exercise in 1994:

We have an offer on the table to them which I think is totally misplaced: to cancel the "Team Spirit" exercise on the grounds that, yes, maybe it is provocative. It did not seem provocative to me during the years we held it regularly when I was in office. It seemed absolutely vital to me that we have the training and the experience and the practice of working together with our South Korean allies, and that we continue to do that on the scale that has been involved in those exercises in the past.⁵³

Despite the utility of the exercise, several US government and military officials did not want Team Spirit held hostage to North Korean threats or promises. When the Clinton administration was considering deferring the exercise in 1993, Joint Chiefs of Staff

chairman Colin Powell resisted its efforts.⁵⁴ Several US senators also opposed cancellation of the 1994 Team Spirit exercise. Senator Bob Smith (R-NH) noted that the NPT required the inspections and that they should not have been contingent upon holding the exercise: "The cancellation of Team Spirit rewards North Korean intransigence and sends a terrible message to the international community that treaty accountabilities can be bargained away." Senator William Cohen (R-ME) expressed concern that cancellation of the exercise would make it difficult to restart because the United States "will be accused of ratcheting up the tension."⁵⁵ To Senator John McCain (R-AZ), cancelling Team Spirit "for the sake of a single concession which is entirely inadequate as a means of determining the extent of North Korea's nuclear program is without a doubt the worst signal the United States could send."⁵⁶

Team Spirit's Value

Continuing Team Spirit, however, was becoming increasingly costly. Transportation expenses for deploying and redeploying forces to the peninsula and sustaining them in the field for at least a month had become enormous. In 1984 the cost to the Air Force alone amounted to \$30 million.⁵⁷ By 1991 total outlay for the exercise had reached \$150 million.⁵⁸ By 1993 the combined cost of all exercises since Team Spirit's inception in 1976 approached \$900 million.⁵⁹ For budgetary reasons, some people in the Defense Department wanted to change Team Spirit from an annual to a biannual exercise.⁶⁰ In 1991 Secretary of Defense Dick Cheney considered eliminating the exercise altogether as a cost-saving measure.⁶¹ Maintaining the most expensive exercise held by the Pentagon was becoming financially onerous when post-Cold War defense budgets were being trimmed.

Additionally, several individuals in the Defense Department wondered if the military value of Team Spirit justified the cost. Although billed as a capabilities exercise to defend against a North Korean invasion, since 1979 the field maneuver had never exercised the war operation plan (OPLAN). Despite objections from the Air Force and Navy component commanders of Pacific Command, Gen John A. Wickham Jr., commander of US Forces in Korea, indicated that he wanted to concentrate the exercise on activities that would produce the greatest benefit for forces facing a contingency and did not want to "fetter" Team Spirit with "the rigid test of war plans."⁶² Hence, units were divided into Blue and Orange forces, fighting a simulated east-west rather than north-south battle scenario. Some units switched sides during the exercise or played on both sides simultaneously. In addition, several units participating in Team Spirit exercises were not tasked by the OPLAN, and those participating units with a wartime tasking were often not put in their OPLAN deployment locations. An Air Force audit of the 1984 Team Spirit exercise noted that none of the seven engineering units from Tactical Air Command tasked in the OPLAN had participated in any of the previous three Team Spirit exercises.⁶³

Questions on the military value of Team Spirit emerged during the early 1990s. After substantial curtailment of Team Spirit in 1991 due to Desert Storm, Gen Robert W. RisCassi, commander of US Forces in Korea, still commented that "exercise objectives were maintained and accomplished."⁶⁴ Secretary of Defense Les Aspin inquired in 1993 if suspending the exercise would have ramifications for military preparedness on the Korean Peninsula.⁶⁵ After the United States cancelled Team Spirit 94 to facilitate NPT negotiations with North Korea, State Department spokesman Michael McCurry released a statement saying that "the suspension of Team Spirit '94 will not weaken our joint defensive capabilities."⁶⁶ Gen Gary Luck,

commander of US Forces in Korea at the time, concurred, noting that the scheduled exercise would have been small: "We didn't have a lot programmed for it. If we can get a breakthrough [over nuclear inspections] it would be prudent" to cancel the exercise.⁶⁷

Alternatives to Team Spirit

In 1991 Secretary Cheney proposed enlarging other exercises on the Korean Peninsula to replace Team Spirit, prompting a military official to comment that if the North Koreans "missed Desert Storm . . . this is a chance to catch a re-run."⁶⁸ General Luck remarked that the cancellation of Team Spirit was not a great loss and that, although military needs had to be met, "there are lots of ways to skin this cat."⁶⁹ Responding to criticism for cancelling the exercise, Undersecretary of State for International Security Affairs Lynn Davis stated that "we plan to continue our other major joint exercises in South Korea."⁷⁰ A spokesman for the US/ROK Combined Military Command repeated this assurance in 1997, declaring that the cancellation of Team Spirit for the fourth year in a row would not affect readiness because several smaller exercises would fill the void.⁷¹

The exercises slated to replace Team Spirit were smaller but considered more realistic, at least in terms of the OPLAN. The most established one, Foal Eagle, originated in 1961 as an ROK battalion-level exercise. In 1975 it expanded into a combined special forces exercise that tested OPLAN taskings. In the absence of Team Spirit, Foal Eagle expanded again in 1997 to include a corps-level field-training exercise component, later reduced to brigade level.⁷² Since 2001, Foal Eagle has occurred in conjunction with the annual reception, staging, onward movement, and integration (RSOI) exercise.⁷³ The reception, staging, and onward-movement operation, which reunited a unit's personnel and equipment following deployment,

traditionally took place during Team Spirit.⁷⁴ The cancellation of Team Spirit, however, also eliminated the exercise designed to prepare for deploying personnel to Korea, thus leading to the initiation of RSOI in 1994. Primarily a computer-simulation exercise, RSOI utilizes the OPLAN time-phased force and deployment data—the database that lists the forces, beddown locations, and movement requirements.⁷⁵ The combined Foal Eagle / RSOI exercise takes up the scheduled slot in the spring, when Team Spirit was normally held, but brings only 4,000–7,000 additional personnel into the Korean Peninsula, compared to the nearly 200,000 at Team Spirit's peak.⁷⁶ Another replacement exercise, Ulchi Focus Lens, began as separate ROK and US war-readiness exercises in 1969 that combined in 1976. In the late 1980s and early 1990s, it evolved into a computer-simulated command-post exercise to train staff at corps level and above on the OPLAN and to review the time-phased force and deployment data.⁷⁷ Held every August, Ulchi Focus Lens has normally brought 3,000 additional personnel into South Korea.⁷⁸ Having accomplished its goal of eliminating Team Spirit, North Korea has predictably revised its propaganda to aim at these alternate exercises by calling RSOI and Foal Eagle "an enlarged version of the 'Team Spirit' joint military exercises." The DPRK further charges, with some degree of accuracy, that after the suspension of Team Spirit, "the U.S. and South Korean authorities have included its function in other large-scale joint military exercises and staged combined offensive maneuvers against the DPRK without interruption."⁷⁹ In the tradition of Team Spirit, Pyongyang cited these exercises as a reason for withdrawing from the NPT in 2003.⁸⁰

Team Spirit's Legacy

Although Team Spirit has not been conducted since 1993, the United States

has never permanently cancelled it, at least not officially. Each year the government makes a decision as to the disposition of the exercise, contingent upon North Korea's compliance with the NPT. The United States occasionally brings up Team Spirit to threaten the North should it choose not to honor treaty commitments. After the first cancellation in 1992, General Riscassi warned that stalling from the North "could well reverse the progress made to date," a prediction that came true with the one-time resumption of the exercise the following year.⁸¹ Gen John Shalikashvili, chairman of the Joint Chiefs of Staff, said that he agreed with the cancellation of the 1994 Team Spirit exercise but indicated that he wanted the maneuvers to return the next year.⁸² Gen Thomas Schwartz, commander of US forces in Korea in 2000, stated before the Senate Armed Services Committee that, although Team Spirit had been suspended, "the option remains open to conduct the large-scale dramatic demonstration of South Korean and United States resolve to defend against North Korean aggression."⁸³ The ghost of Team Spirit still seems to haunt the Korean Peninsula.

Few doubt this exercise's military value in that it effectively trained US and ROK personnel in the field. Its political value in intimidating the North and eventually persuading the North Koreans to adhere to treaty obligations, however, appears to have been worth the sacrifice of cancelling an exercise that had become quite expensive and did not exercise the actual war plan, especially when several smaller and less costly exercises could adequately fill that bill.

One could well argue that, since the North eventually violated the 1994 Agreed Framework by developing and testing a nuclear device on 6 October 2006, the entire venture of including Team Spirit in nuclear negotiations came to naught. If one takes the longer view and looks at denuclearizing the Korean peninsula as a process rather

than as a single result, however, then utilizing the exercise to achieve political purposes has proven beneficial. At this writing, the North Koreans have allowed inspectors from the International Atomic Energy Agency into their nuclear facilities and appear willing to exchange their ambitions of nuclear weaponry for economic relief and assistance. The role that Team Spirit played, and still plays, in that process was, and remains, significant.

Conclusion

Even though he referred to them as a "feeble substitute for the real thing," Clausewitz recognized military exercises as the next best method in preparing troops for war: "Even they can give an army an advantage over others whose training is confined to routine, mechanical drill. To plan maneuvers so that some of the elements of friction are involved, which will train officers' judgment, common sense, and resolution is far more worthwhile than inexperienced people might think."⁸⁴

The show of force that a military exercise such as Team Spirit brings to the political situation following the cessation of major combat operations could also be worthwhile. Considering the political as well as the combat efficacy when initiating, planning, conducting, and possibly cancelling military exercises can become important when dealing not only with adversaries but also allies. People should bear in mind their goals when weighing the options and the military or political gains that they can realize by continuing or cancelling an exercise. Finally, pondering these considerations in light of the cost, the exercise's realism in the field (as well as its relevance to actual war plans), and the question of whether alternative military exercises can achieve the same or similar objectives, can prove beneficial in making these decisions. ★

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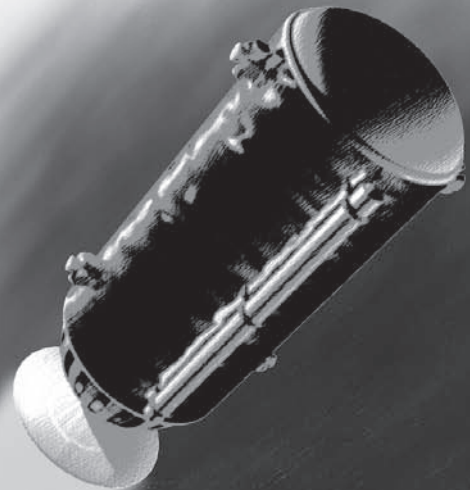
Deterrence and Space-Based Missile Defense

Lt Col Lorinda A. Frederick, USAF

During the Cold War, the United States relied on the nuclear triad to deter ballistic missile threats emanating from the Soviet Union. Today, the threat is expanding to include rogue elements and proliferators of missile technologies undeterred by Cold War methods. Missile technology is growing despite political attempts to stop it. The United States and other nations are fielding advanced missile defenses to counter the threat posed by proliferating ballistic missiles. However, this air-, land-, and sea-based missile defense architecture lacks redundancy and depends on the proper positioning of assets to intercept missiles in their midcourse and terminal phases of flight. This architecture also lacks a reliable capability to intercept missiles during the boost phase—a capability perhaps best provided from space.

Deterrence before Ballistic Missile Defense

The Department of Defense (DOD) defines *deterrence* as a “state of mind brought about by the exis-



tence of a credible threat of unacceptable counteraction."¹ "Counteraction" conjures up Cold War images of massive retaliation and vulnerability when the adversary could threaten not only vital interests but also national survival. In the absence of ballistic missile defense (BMD), the US military could not negate or counter the missile threat facing the nation without retaliating in kind. Effective deterrence denies an adversary the benefits of his actions, imposes costs, and/or encourages restraint.²

The United States refined its deterrence strategy during the Cold War from massive retaliation to mutual vulnerability to assured destruction. Massive retaliation, a policy adopted by the North Atlantic Treaty Organization in 1954, threatened an overwhelming nuclear response to any Soviet aggression.³ Limited options forced the United States into a position of fighting fire with more fire or, more precisely, fighting threats with more threats.

Massive retaliation evolved into mutual vulnerability in the late 1950s, when the Soviet Union appeared to match US nuclear capabilities: "With each side vulnerable to a nuclear strike by the other, nuclear weapons no longer conferred a simple military advantage, and their use could not be threatened unilaterally to deter general aggression by a nuclear-capable opponent."⁴ Mutual vulnerability made sense in a time when BMD could not negate or even reduce the threat.

As the Soviet Union and United States continued to increase their nuclear arsenals, mutual vulnerability was bolstered with assured destruction. In the 1960s, the strategy of assured destruction "required each side to possess a guaranteed second-strike capability, one which could survive the opponent's massive, and possibly unanticipated, first strike."⁵ This strategy did not eliminate mutual vulnerability because one side's ability to defend against an attack might weaken deterrence by tempting it to strike its adversary first.

To reinforce the stability provided by assured destruction, both sides agreed to limit BMD severely, as set out in the Anti-Ballistic Missile (ABM) Treaty. Such defenses were considered destabilizing during the Cold War because strategists predicted that a defended nation might strike first, confident that it was protected from the limited retaliatory strikes of its adversary's surviving nuclear forces. In truth, these newly emerging BMD technologies had not matured to the point where nations could trust their performance.

Deterrence and Ballistic Missile Defense

After the Cold War, deterring ballistic missile threats became more complicated due not only to the increasing numbers of nuclear-capable states but also to the rise of hostile rogue elements within a state as well as the proliferation of weapons of mass destruction (WMD), along with missile technology and expertise.⁶ According to joint doctrine, "the predominant threat is not from a competing superpower, but more likely from the deliberate launch of a ballistic missile from a 'rogue state,' failed state, or terrorist group."⁷ Yet, the United States has difficulty tracking ballistic missiles due to the shortage of accurate and reliable intelligence, having "been surprised in the past by an opponent's earlier-than-expected military technology, including the testing of the Soviet hydrogen bomb, the testing of missiles by Iraq and North Korea, and the acquisition of Chinese missiles by Saudi Arabia."⁸ Consequently, the "proliferation of advanced technologies for missiles, guidance systems, and WMD warheads has *increased the potential missile threat to the homeland*" (emphasis in original).⁹ Today, the United States must attempt to deter both state and nonstate actors.

Nonstate actors and rogue elements complicate deterrence for a number of

reasons.¹⁰ First, rogue elements' decision makers are harder to identify and locate, let alone deter, than their state counterparts. Without the ability to attribute the use of WMDs to a rogue-element actor, or even its state sponsor, the United States may have difficulty deterring an attack. Leaders of rogue elements and proliferators threaten US, regional, and global security interests because they defy international laws or norms of international behavior and use asymmetric means to attack law-abiding nations.

Second, the fact that states operate more in the open allows the United States to gauge their perceptions, based on their actions: "The objective of deterrence is to convince potential adversaries that courses of action that threaten U.S. national interests will result in outcomes that are decisively worse than they could achieve through alternative courses of action."¹¹ Because rogue elements do not operate in the open, the United States cannot accurately gauge their perceptions of capability and will.

Third, the United States cannot threaten to inflict substantial costs on rogue elements that have few high-value assets, minimal territorial claims, and small populations, compared to their state counterparts.¹² An adversary's hidden calculation of cost, benefits, and risks complicates the US approach to deterrence.

Fourth, it may prove difficult to discern what is important to rogue elements. The United States could easily assume that they share its goals and values—but this is a dangerous assumption.

Fifth, the United States has neither established nor exercised communication channels with rogue elements to the same extent that it has with state actors. Communication is a necessary component of deterrence strategy with regard to relaying the United States' intent to respond to aggression. Even after receiving a clear message, rogue elements may not be deterred. BMD could help the United States deter aggression and respond should deterrence fail.

The Role of Ballistic Missile Defense in Deterrence

BMD should primarily be considered a vital part of a deterrent strategy and secondarily an effective tool to protect against ballistic missile attacks. BMD is an integral part of deterrence because it makes escalation less likely. Confidence in BMD technology may allow US decision makers to accept an increased risk of attack and allow time for other instruments of power to defuse the situation. Adversaries must consider US defensive capabilities in relation to their offensive capabilities. Confident that inbound ballistic missiles will not reach the homeland, the United States could choose not to respond in kind to such provocation.

Extending BMD to friendly states bolsters deterrence because it effectively conveys to potential aggressors the US commitment to defense. Extended deterrence can keep other states out of the conflict. For example, the United States provided Israel with theater missile defense (TMD) during Operations Desert Shield and Desert Storm to protect the Israelis and keep them out of the broader conflict. Extended deterrence may encourage allies to "forgo indigenous development or procurement of duplicative military capabilities, thereby enhancing US counterproliferation efforts."¹³ BMD is more than just a defensive measure that the United States possesses to knock down threatening missiles. Decision makers should think of it as a vital part of deterrence to help restrain rogue elements and proliferators.

Presidential Perspectives on Missile Defense

Key political decisions made during the presidential administrations of Ronald Reagan, George H. W. Bush, Bill Clinton, and George W. Bush highlight the progress (or lack thereof) made towards developing potential missile defense capabilities.

Pres. Ronald Reagan

When he entered office in 1981, President Reagan inherited a deterrence strategy based on assured destruction, which relied on the unmistakable ability to inflict an unacceptable degree of damage upon any aggressor or combination of aggressors—even after absorbing a surprise first strike. Frustrated with this strategy, he announced the Strategic Defense Initiative (SDI) in 1983, beginning the United States' pursuit of an active national missile defense (NMD). Thus began a research and development (R&D) effort to protect the United States against a full-scale missile attack from the Soviet Union.¹⁴ The envisioned system would consist of air-, land-, sea-, and space-based sensors and interceptors. Space-based elements included “constellations of Earth-orbiting battle stations” that would destroy ballistic missiles during their boost and midcourse phases.¹⁵ Technologies developed under SDI would allow deterrence policies to rely on defending the United States instead of destroying the enemy.

The concept of using space-based hit-to-kill interceptors emerged from Project Defender, founded in 1958 by the Defense Advanced Research Projects Agency (DARPA), which recognized the promise of advanced weapons and initiated the development of laser technology scalable to the power levels required for BMD.¹⁶ In 1980 DARPA began exploiting newly emerging laser and particle-beam technologies for BMD applications, including space-based laser defense against ballistic missiles and aircraft.¹⁷ DARPA programs brought the United States closer to deterring and responding to ballistic missile attacks from space.

Technologies pursued under SDI could be restricted, depending on the administration's interpretation of the ABM Treaty. According to Article 5 of the treaty, “each Party undertakes not to develop, test, or deploy ABM systems or components which are sea-based, air-

based, space-based, or mobile land-based.”¹⁸ The administration reinterpreted the ABM Treaty to allow for the testing of space-based missile defense (SBMD) technologies.¹⁹ Although members of Congress largely supported increased R&D, they rejected this broad interpretation of the treaty. It was one thing to explore the potential of SBMD on paper and develop technology; it was quite another to test and demonstrate the capability.

SDI challenged the traditional treatment of space as a sanctuary.²⁰ Believing that the benefits of missile defense outweighed the costs, President Reagan stood up new organizations and attempted to break down barriers, allowing these organizations to explore space capabilities for defense. This display of will to deploy SBMD technologies did not go unnoticed by the rest of the world, the Soviet Union in particular. At a summit meeting in 1986, Soviet president Mikhail Gorbachev pressed President Reagan to “accept limitations to the SDI program as a pre-condition for other agreements restricting offensive arms.”²¹ The Soviet Union opposed SDI because the new capabilities could weaken its power and security; however, President Reagan refused to accept any restrictions.

In order to win the Cold War, President Reagan was willing to challenge old paradigms about deterrence and rethink treaty obligations, asking, “Wouldn't it be better to save lives rather than to avenge them?”²² According to Henry Kissinger, former national security adviser and secretary of state, “Soviet leaders were not impressed by Reagan's moral appeals, but they were obliged to take seriously America's technological potential and the strategic impact of even an imperfect defense.”²³ President Reagan was looking for a technological alternative to assured destruction. The bipolar world in existence at the start of his presidency would radically change in the next administration.

Pres. George H. W. Bush

President Bush faced the daunting task of shifting the United States from bipolar to multipolar threats. The Warsaw Pact dissolved in 1989, as did the Soviet Union two years later.²⁴ Regional threats, such as those from Iraq and Iran, as well as continued missile proliferation, became more apparent. Iraq's invasion of Kuwait in 1990 and the global response in the form of Desert Storm charted a course for multilateral relationships. During the Cold War, space systems had focused on the strategic threat posed by the Soviet Union, but as the strategic environment shifted, they began to support multiple regional threats.

President Bush's administration reviewed SDI as part of a broader examination of US strategic requirements for an emerging "New World Order" in which assured destruction no longer formed the basis of deterrence.²⁵ The review concluded that the most important threat to the United States would come from unauthorized or terrorist attacks by limited numbers of missiles. Additionally, deployed US forces would face increasing threats from shorter-ranged theater missiles due to the proliferation of ballistic missile technology.

Responding to this change in threat, President Bush announced that the DOD was refocusing the SDI program away from defending against a massive Soviet missile attack towards implementing a system known as Global Protection Against Limited Strikes (GPALS), designed to protect US forces overseas, US friends and allies, and the United States itself from accidental, unauthorized, and/or limited ballistic missile strikes.²⁶ GPALS had three components, only one of which—Brilliant Pebbles—relied on space. Space capabilities played a supporting role in the other two components—TMD and limited NMD. A constellation of small, autonomous, kinetic-energy interceptors, Brilliant Pebbles would detect and destroy ballistic missiles in their boost, postboost, and early midcourse

phases of flight.²⁷ A March 1992 report to Congress highlighted the potential of Brilliant Pebbles for intercepting every Iraqi Scud missile launched against Israel and Saudi Arabia during the Gulf War.²⁸ This insight was based on simulations of actual Defense Support Program data collected on Scud launches.

The space-based laser (SBL), another program that showed potential for missile defense, sought to detect, track, engage, and destroy theater and strategic ballistic missiles in their boost, postboost, and midcourse phases.²⁹ The program examined the capability of directed-energy weapons, such as lasers, to destroy targets on or above Earth's surface.³⁰ Energy delivered by a laser would propagate at the speed of light and stay on target until that energy accumulated to a destructive level.³¹ After destroying the missile, the laser could quickly target the next missile and continue this process until it ran out of either fuel or targets.³² Multiple SBLs could increase the probability of the missile defense architecture's successfully intercepting incoming missiles.

Reassured because the deterrent effect of its missile arsenal would remain intact for the time being, the Soviet Union (now Russia) welcomed the Bush administration's shift from SDI, which emphasized defense against large-scale attacks, to GPALS, which emphasized defense against limited attacks. But rogue elements and other states now had cause for concern since the United States was on a fast track to acquiring BMD capabilities that could negate missile technology they might acquire. President Bush appreciated the value of missile defenses and had the will to field them.

Pres. Bill Clinton

President Clinton continued the shift in focus of missile defense programs from national to theater applications during his administration. This shift became apparent in his narrow interpretation of

the ABM Treaty's prohibition of the development, testing, and deployment of sea-, air-, space-, and mobile land-based ABM systems and components.³³ Showing its support for missile defense, Congress continued to fund SBMD development programs. However, because President Clinton preferred land-based missile defense programs over space-based programs, he ended Brilliant Pebbles.³⁴ The Advanced Technology Kill Vehicle program, which used technology developed through Brilliant Pebbles to produce small, lightweight kill vehicles for use in surface-based interceptors, died as well.

President Clinton also cancelled the *Clementine II* space probe due to concerns about violating the ABM Treaty.³⁵ By firing small projectiles at asteroids, it would test technologies for use in missile defense applications.³⁶ *Clementine II* would have demonstrated SBMD-relevant technologies to quell political concerns about the potential of Brilliant Pebbles technology.³⁷ The first *Clementine* technology demonstration program also attempted to space-qualify first-generation Brilliant Pebbles miniature, self-contained hardware and software.³⁸ "This *Clementine* mission achieved many of its technology objectives during its flight to the Moon in early 1994 but, because of a software error, was unable to test the autonomous tracking of a cold target."³⁹ Fluctuating political concerns and differing interpretations of the ABM Treaty reflected changes in the US will to deploy SBMD.

These cancellations might have been an instinctive reaction to the end of the Cold War and the perceived lack of a credible ballistic missile threat. However, the world became more dangerous following the Cold War because, instead of the threat emanating from one country, now it came from many smaller countries. Not realizing that the ballistic missile threat was increasing, the United States cut funds for missile defense, and

teams of technologists either moved on to other projects or disbanded.

The world remained a dangerous place, so the nation still needed the benefits that missile defenses could offer. In 1998 the Iranians flight-tested their medium-ranged Shahab-3 missile, quickly followed by a North Korean Taepodong-1 missile launch demonstrating their capability to extend the missile's range by using a third stage.⁴⁰ Reacting to these two events, the United States began development of TMD, a light, mobile, land-based BMD system that would thwart very limited nuclear attacks.⁴¹

Russia took the US pursuit of missile defenses seriously. After a summit meeting, President Clinton and Russian president Boris Yeltsin expressed interest in pursuing cooperative TMD activities and issued guidance concerning the TMD capabilities not permitted under their new agreement. Both sides agreed not to "develop, test, or deploy space-based TMD interceptor missiles or components based on other physical principles capable of substituting for interceptors."⁴² Even though previous presidents had argued that the ABM Treaty did not ban space-based TMD components, President Clinton committed the United States to refrain from deploying them, thereby reinforcing his views of space as a sanctuary.

With the emphasis now on TMD, the Clinton administration still needed to determine what should happen with NMD. The "3+3" program, created in June 2000, accelerated research and testing for the next three years to build up information needed to assist the president in deciding whether or not to deploy an NMD system. Furthermore, the system would then be fielded within three years of the decision to deploy. Although President Clinton had the opportunity to make a deployment decision before leaving office, he did not do so.

Concerns about the costs of missile defense started to override the benefits during President Clinton's administration. The elimination of Brilliant Pebbles

and Clementine, as well as the decision to continue studying NMD rather than make a deployment decision, indicates that President Clinton had doubts about the benefits of NMD. His willingness to negotiate with President Yeltsin on TMD criteria showed that he valued missile defense. President Clinton calculated the strategic threat and potential benefits differently than previous presidents. The threats remained, and missile defenses were still viable—but those defenses, particularly space-based components, were too expensive to develop and field.

Pres. George W. Bush

President Bush's administration took an active interest in missile defense. His secretary of defense, Donald Rumsfeld, chaired the 1997 Commission to Assess the Ballistic Missile Threat to the United States, which concluded that the United States would have little or no warning of threatening ballistic missile deployments and argued that America should develop the means both to deter and defend against hostile acts.⁴³

In late 2001, President Bush announced the United States' withdrawal from the ABM Treaty with the former Soviet Union: "I have concluded the ABM Treaty hinders our government's ability to develop ways to protect our people from future terrorist or rogue state missile attacks."⁴⁴ While abiding by the ABM Treaty, the United States could not pursue the deployment of land-based missile defenses. Its withdrawal from the treaty made clear to Russia and the world that the United States was committed to developing missile defenses to counter an attack. As long as the ABM Treaty remained in place, it blocked prospects of an effective missile defense for the United States and limited options for defending military forces, allies, and coalition partners stationed overseas.⁴⁵

For President Bush, the benefits of missile defense once again overrode the costs of both TMD and NMD. Like Presi-

dent Reagan, President Bush sought to remove the restriction on deploying such a defense. The United States was willing to seek unilateral options for deterring ballistic missile attacks by creating a credible defense. The full range of missile defense options (including SBMD) became available when the United States withdrew from the ABM Treaty.

The Current Ballistic Missile Defense Architecture

The United States must maintain the technological capability to respond if deterrence fails. Multiple opportunities to intercept an incoming ballistic missile increase the probability of a successful interception. BMD "must provide an active, layered defense that allows multiple engagement opportunities throughout the boost, midcourse, and terminal phases of a missile's flight to negate or defeat an attack as far from the Homeland as possible."⁴⁶ Throughout these phases, a BMD could incorporate land-, sea-, air-, and space-based elements, using both kinetic and nonkinetic means to destroy hostile missiles.⁴⁷

The nation's current BMD architecture relies on space components to sense and cue terrestrial interceptors. Space-based sensors can detect the heat of the burning booster during its boost phase and transmit trajectory information to ground stations. Once the booster extinguishes and infrared-sensing satellites lose track of the missile, radars can track it throughout the remaining flight time. These radars cue terrestrially based BMD elements so they can attempt to intercept the missile. Commanders on the ground, in turn, can launch interceptors to destroy it. Currently, the United States possesses land- and sea-based kinetic-kill intercept capabilities but no space-based intercept capability.

The level of support for SBMD capabilities has waned since President Reagan first started SDI, but support for land-

and sea-based missile defense has remained stable and even grown. President Reagan supported R&D for missile defense in all mediums (air, land, sea, and space) and provided the funding to back his SDI program. Pres. George H. W. Bush continued President Reagan's initiatives but at a reduced level due to the changing threat environment and declining defense budget. President Clinton favored missile defense, with the exception of SBMD; however, he did not provide enough funding for it, thus limiting the scope of BMD to TMD. Pres. George W. Bush reinvigorated missile defense by extending BMD to incorporate NMD in all mediums except space, where he opened the door, enabling future presidents to cross this threshold.

Benefits of Space-Based Missile Defense

Many characteristics of SBMD could create uncertainty in the minds of potential adversaries about whether or not they could achieve their aims.⁴⁸ Space provides access to threats in areas that terrestrial, maritime, and airborne defenses cannot reach. SBMD is capable of destroying ballistic missiles over the enemy's territory before they release multiple reentry vehicles or countermeasures designed to thwart defenses.

The constant forward presence of SBMD could allow the United States to limit its military footprint on foreign soil and support many military operations simultaneously. Land- and sea-based interceptors have to be placed in areas where they can provide credible protection from ballistic missile attacks. Pre-positioning infrastructure, supplies, and equipment may shorten response times when hostilities erupt, but they are costly and difficult to sustain. SBMD allows a nonintrusive forward presence because it does not require the pre-positioning of assets on other territories.

Furthermore, employing SBMD is not contingent on approval from another nation. The continued presence of US assets on foreign soil depends on the host nation's accepting or approving the mission that those assets support. If defenses are not in position, deterrence is reduced. Stationed in the right orbits in the right quantities, SBMD could deter or defend against attacks around-the-clock, especially if used in concert with other sea- and land-based missile defenses.

Responding to Countermeasures

Potential adversaries may develop countermeasures in response to the US fielding of an SBMD because the latter would make their capabilities ineffective. R&D of countermeasures, which takes time and money, may result in reduced payload and/or range of the missile. These monetary and performance costs may be enough to deter an adversary from attempting countermeasures.

One countermeasure against non-kinetic SBMD capabilities—hardened missiles—could have a reduced payload due to the added weight of the hardening material and additional fuel needed to reach the required distances. The adversary could also field more missiles to saturate the missile defense architecture.⁴⁹ The saturation point depends upon the numbers of both space-based and terrestrially based interceptors deployed. Because decoys and countermeasures are deployed after boost phase, SBMD could lighten the load for midcourse and terminal-phase defenses.

The adversary could also shift from ballistic missiles to cruise missiles but would pay a penalty in terms of speed, reach, and destructive potential. These penalties, in combination with existing cruise missile defenses, could make an attack less likely to succeed. Space sensors designed to trigger SBMD could also trigger TMD to intercept cruise missiles.

SBMD could increase the effectiveness of the current BMD architecture even if the adversary employs countermeasures. Credible capabilities have the potential to deny an adversary's objectives and therefore may deter him from employing ballistic missiles altogether. Key political decisions help explain the progress (or lack thereof) made towards exploring and developing the potential of SBMD.

The Way Ahead

SBMD progressed through various programs, such as GPALS, Brilliant Pebbles, Clementine, and SBL, despite dwindling support from presidential administrations following President Reagan's. Pres. George W. Bush paved the way for the next administration to put SBMD on the international agenda. According to *The National Security Strategy of the United States of America* (2006), the United States may need new approaches to deter state and nonstate actors and deny them the objectives of their attacks.⁵⁰ Additionally, the *National Strategy to Combat Weapons of Mass Destruction* (2002) states that "today's threats are far more diverse and less predictable than those of the past. States hostile to the United States and to our friends and allies have demonstrated their willingness to take high risks to achieve their goals, and are aggressively pursuing WMD and their means of delivery as critical tools in this effort. As a consequence, we require new methods of deterrence."⁵¹

Cooperation on missile defense initiatives could increase global stability. By banding together in coalitions, countries can deter war by repelling an attack against any member.⁵² States and rogue elements will not be able to strike surreptitiously if they know that the international community could quickly discern the origin of any launch and compute potential impact points. Attempts by a rogue element to destabilize the region through the attribution of at-

tacks to a state may initially promote the rogue elements own agenda. However, data provided by missile defense and other sensors can refute such claims. The shared international ability to identify launch and impact points might deter states and rogue elements from launching in the first place. The more nations cooperate with each other, the more stable the world becomes.

Policy makers need to invest in the development of many different capabilities, including SBMD, to negate missiles in their boost phase and use the information gleaned from these developments to inform decisions. One approach involves bringing a system to the prototype stage for testing and accurately gauging its performance. This approach could let the United States invest in only a limited number of prototypes, thus deferring large-scale production to allow further research, development, and testing. These efforts could decrease the risk of failure during production and deployment.⁵³ When the need arises, the United States should capitalize on preexisting prototypes as long as the industrial base could support rapid production.

By funding R&D for SBMD, the United States would ensure the viability of these technologies. The DOD cannot expect developments in commercial industry to be available for national security purposes. Competitive pressures force industry to fund near-term R&D programs and choose near-term survival over long-term possibilities.⁵⁴ Applied research into SBMD technologies would allow the United States to gain more knowledge about boost-phase defenses. America will get as much R&D in SBMD technologies as it is willing to fund.

The United States may need to examine the standards it applies to the fielding of other BMD systems and adjust expectations for an initial SBMD capability. Henry Kissinger has commented on the standard of perfection applied to missile defense:

The experts had all the technical arguments on their side, but Reagan had got hold of an elemental political truth: in a

world of nuclear weapons, leaders who make no effort to protect their peoples against accident, mad opponents, nuclear proliferation, and a whole host of other foreseeable dangers, invite the opprobrium of posterity if disaster ever does occur. That it was not possible at the beginning of a complicated research program to demonstrate SDI's maximum effectiveness was inherent in the complexity of the problem; no weapon would ever have been developed if it first had had to submit to so perfectionist a criterion.⁵⁵

Fielding even imperfect elements of the architecture may deter an adversary, as occurred in Desert Storm when imperfect TMD helped keep Israel out of the war.

The fact that senior leaders and policy makers tend to focus on current issues because they are more tangible puts the United States at risk of not funding research critical to its future defense. America may need to avoid pressures to sacrifice long-term research for the sake of short-term procurement by moving away from having policy determine the technologies pursued and letting feasible technologies inform policies necessary to deter threats.

Conclusion

Credible deterrence depends on technological capability and political will. During the Cold War, the United States relied on the nuclear triad to deter ballistic missile threats emanating from the Soviet Union. These capabilities rein-

forced the political will expressed through policies such as massive retaliation and assured destruction. We had no defense against ballistic missile attacks. Today, the nuclear triad still deters threats from Russia and China; however, the threat has expanded to include rogue elements and proliferators undeterred by Cold War methods. The current land- and sea-based missile defense architecture provides a limited defense against these threats, but it lacks redundancy and depends on the proper positioning of assets to intercept missiles in their midcourse and terminal phases of flight.

Attaching a monetary figure to SBMD is difficult. A cost/benefit assessment should include potential cost savings in other parts of the missile defense architecture in relation to the benefits, including rapid responsiveness, global power projection, and constant presence. The United States must also consider the cost of expanding current missile defense layers to achieve the added deterrent and protective effect that SBMD could provide. Putting a monetary value on deterrence represents the main difficulty of a comprehensive assessment.

The continued proliferation of ballistic missile technology to states and rogue elements warrants increased research into SBMD. The United States should continue to demonstrate the international will necessary to help deter the proliferation of ballistic missiles while providing the capability to defend against rogue elements should deterrence fail. ★

Notes

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2. Department of Defense, *Homeland Defense and Civil Support Joint Operating Concept*, 1 October 2007, 42, http://www.dtic.mil/futurejointwarfare/concepts/joc_hld_v20.pdf.

3. Paul Cornish, "Deterrence," in *The Oxford Companion to Military History*, ed. Richard Holmes (New York: Oxford University Press, 2003), 258.

4. Ibid.

5. Ibid.

6. House, Dr. Keith B. Payne, Professor and Department Head, Graduate Department of Defense and Strategic Studies, Missouri State University, *Testimony before the House Armed Services Committee, Subcom-*

mittee on Strategic Forces, 110th Cong., 1st sess., 18 July 2007, <http://www.nipp.org/Adobe/7-07%20testimony-delivered.pdf>.

7. JP 3-01, *Countering Air and Missile Threats*, 5 February 2007, xi, http://www.dtic.mil/doctrine/jel/new_pubs/jp3_01.pdf.

8. Curt Weldon, "Charting a New Course on Missile Defense," in *Spacepower for a New Millennium: Space and U.S. National Security*, ed. Peter L. Hays et al. (New York: McGraw-Hill, 2000), 147.

9. JP 3-01, *Countering Air and Missile Threats*, xi.

10. Department of Defense, *Deterrence Operations Joint Operating Concept* (Washington, DC: Department of Defense, December 2006), http://www.dtic.mil/futurejointwarfare/concepts/do_joc_v20.doc. According to this document, there are five major differences between state and nonstate actors that significantly affect deterrence operations:

1. It can be far more difficult to identify the decision-makers we seek to deter.
2. There is generally greater uncertainty as to how these decision-makers perceive the benefits, costs, and consequences of restraint.
3. State and non-state actors often differ in their susceptibility to our efforts to credibly threaten cost imposition.
4. They may have different goals/objectives, different values, and they employ different means to achieve them.
5. In contrast to non-state actors, deterrence of state actors is facilitated by well-established means of communications between states (4–5).

11. Department of Defense, *Homeland Defense and Civil Support*, 51.

12. Department of Defense, *Deterrence Operations Joint Operating Concept*, 18.

13. *Ibid.*, 71.

14. Steven A. Hildreth, *Ballistic Missile Defense: Historical Overview*, CRS Report for Congress, RS22120 (Washington, DC: Congressional Research Service, 9 July 2007), CRS 3–4.

15. Curtis Peebles, *High Frontier: The U.S. Air Force and the Military Space Program* (Washington, DC: Air Force History and Museums Program, 1997), 67.

16. DARPA, *Technology Transition* (Washington, DC: Defense Advanced Research Projects Agency, 1997), 31, <http://www.darpa.mil/Docs/transition.pdf> (accessed 2 June 2009).

17. *Ibid.*, 32.

18. Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitations of Anti-Ballistic Missile Systems, 3

October 1972, <http://www.state.gov/www/global/arms/treaties/abm/abm2.html>.

19. Hildreth, *Ballistic Missile Defense*, CRS 3–4.

20. Karl Mueller identifies six perspectives on space weaponization: (1) "Sanctuary idealists oppose the spread of weapons or warfare into any new realm," fearing that weapons will lead to warfare. (2) Sanctuary internationalists are concerned about international stability and the offensive influence of space weapons. (3) Sanctuary nationalists oppose space weapons because they could weaken the power and security of the nation. For sanctuary nationalists, the costs of weaponization outweigh the benefits. (4) Space racers are "reluctant space weaponization advocates, who may accept that sanctuary is desirable in the abstract, but who believe that space weaponization is inevitable, and that this makes it imperative for the United States to lead the way in the development and deployment of space weapons." (5) Space controllers believe the benefits outweigh the costs as determined by comparing future military capabilities with and without the potential space weapons. (6) Space hegemonists argue that space will be the critical battlefield, the "ultimate high ground," and should be weaponized as fast as possible. Karl P. Mueller, *Totem and Taboo: Depolarizing the Space Weaponization Debate* (Santa Monica, CA: RAND, 8 May 2002), 6–13, <http://www.gwu.edu/~spi/spaceforum/TotemandTabooGWUpaperRevised%5B1%5D.pdf>.

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23. Henry Kissinger, *Diplomacy* (New York: Simon and Schuster, 1994), 782.

24. Lyles, "Space and Ballistic Missile Defense Programs," 114.

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26. *Ibid.*; and Lyles, "Space and Ballistic Missile Defense Programs," 114.

27. Lyles, "Space and Ballistic Missile Defense Programs," 130.

28. Henry F. Cooper, "Space Defense: An Idea Whose Time Has Come?" in *Spacepower for a New Millennium*, 130.

29. Lyles, "Space and Ballistic Missile Defense Programs," 123.

30. Robert Preston et al., *Space Weapons, Earth Wars*, RAND Report MR-1209-AF (Santa Monica,

CA: RAND, 2002), xvii, http://www.rand.org/pubs/monograph_reports/MR1209.

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33. Willis Stanley, *The Clinton Administration and Ballistic Missile Defense: A Chronology, 1993 to 1998* (Fairfax, VA: National Institute for Public Policy, n.d.), 1–13.

34. Hays et al., *Spacepower for a New Millennium*, 15.

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36. Cooper, "Space Defense," 150.

37. Ibid., 132.

38. William E. Burrows, *This New Ocean: The Story of the First Space Age* (New York: Random House, 1998), 641.

39. National Research Council, *Lessons Learned from the Clementine Mission* (Washington, DC: National Academy Press, 1997), "Conclusions," http://books.nap.edu/openbook.php?record_id=5815&page=21 (accessed 2 June 2008).

40. MDA Historian's Office, "Ballistic Missile Defense."

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Lt Col Lorinda A. Frederick, USAF

Lieutenant Colonel Frederick (BA, Michigan State University; MBA, Regis University; Master of Military Operational Art and Science, Air Command and Staff College; Master of Airpower Art and Science, School of Advanced Air and Space Studies) is assigned to the Air Force Concepts, Strategy, and Wargaming Division, Headquarters US Air Force. She has served as a flight commander and instructor in intercontinental ballistic missile and missile warning squadrons. While assigned to Air Force Space Command, she worked space and missile officer assignments and ICBM requirements. She has deployed to the combined air operations center, combat operations division, space cell, in support of Operation Iraqi Freedom and Operation Enduring Freedom. At US Strategic Command, she served as an exercise planning officer and emergency action officer. Lieutenant Colonel Frederick is a graduate of Squadron Officer School, Air Command and Staff College, and the School of Advanced Air and Space Studies.



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Aerospace Power in the Twenty-first Century:

A Basic Primer by Clayton K. S. Chun. Air University Press (<http://www.au.af.mil/au/aul/aupress>), 131 West Shumacher Avenue, Maxwell AFB, Alabama 36112-5962, 2001, 356 pages, \$29.00 (softcover). Available free from <http://www.au.af.mil/au/aul/aupress/Books/Chun/Chun.pdf>.

Aerospace Power in the Twenty-first Century will appeal to readers searching for a single-volume overview of air and space power. Within its pages, Dr. Clayton K. S. Chun systematically presents definitions of that power, the evolution of air-power theory, and doctrinally recognized missions. The book concludes with chapters that demonstrate how different theories and missions have been successfully combined in actual application and that challenge the reader with areas not yet developed. Overall, the book admirably meets its author's intention of providing the reader with the basics of air and space power. Exceptionally well qualified to author such a primer, Dr. Chun holds the General Hoyt Vandenberg Chair of Aerospace Studies at the US Army War College and currently serves as chair of the Department of Distance Learning. He also completed a successful career as a US Air Force officer.

A particular strength of *Aerospace Power* is its building-block approach to the topic. Dr. Chun begins by reviewing widely recognized principles of war, highlighting what he calls "specific missions that aircraft and spacecraft can accomplish or support"—specifically, "deterrence, compellence, denial, coercion, decapitation, and humanitarian missions" (p. 23). Not doctrinally recognized, these terms represent a thought-provoking departure in that the bulk of the book's material matches nicely with US joint and Air Force doctrine in particular. Chun continues by establish-

ing basic definitions and characteristics of air and space forces as well as the mediums in which they operate. From these foundations, he advances the reader's knowledge by presenting airpower theorists from Giulio Douhet through John Warden. *Aerospace Power* benefits from the author's inclusion of both non-US theorists such as John Slessor and non-Air Force thinkers such as William A. Moffett. He includes a limited discussion of emerging space-power theory; however, very little unclassified, published information exists from which Dr. Chun can draw, and there is no recognized advocate of a particular brand of space-power theory.

Chun uses the next four chapters to walk readers through the "Functions and Capabilities of Aerospace Power," focusing each one on more doctrinally familiar topics such as air superiority, interdiction, and mobility. A particular strength of the author's approach is his use of a case-study methodology to support the chapters' conclusions, carefully including in each a notable failure of air and space power contrasted with two successful examples, thus highlighting his conclusions and bolstering the reader's interest. Notably, he employs a number of examples outside the United States' experience with air and space power—one of the most appealing aspects of the book. He also does an excellent job of referring back to the theorists and doctrinal ideas presented earlier, linking them to the case studies in each chapter. Doing so serves not only to reinforce the theorists and their ideas but also to demonstrate how those theories fared and evolved in practice.

More comprehensive than many similar works, *Aerospace Power* includes a chapter focused on the often-overlooked area of "Planning for Aerospace Operations." Chun demonstrates an instructive approach to building an air and space campaign that supports a combatant commander's campaign and integrates with other components.

The book suffers from some notable omissions, however. Chun mentions rotary-wing aviation only in passing, as is the case with some vital mission areas such as combat search and rescue. Indeed, the author himself points out that the efficacy of a number of the theoretical underpinnings of his book has not been evaluated against enemies employing guerrilla tactics. Nevertheless, readers familiar with current Air Force doctrine will find themselves very much at home with *Aerospace Power*, which admirably fulfills the author's intention of writing a primer on current practice. That said, events since 9/11

as well as air and space power's role in the global war on terrorism underscore the need for a second edition.

Col Thomas L. Gibson, USAF
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Honor: A History by James Bowman. Encounter Books (<http://www.encounterbooks.com>), 900 Broadway, Suite 400, New York, New York 10003, 2006, 381 pages, \$25.95 (hardcover); 2007, 381 pages, \$18.95 (softcover).

Where have all the heroes gone? James Bowman presents a persuasive case that honor is a major, driving force for all cultures outside the West—none more so than in the Islamic world. Only in the United States and the rest of Western culture has honor evolved away from what it was in ancient times. According to the author, in the absence of this virtue's partial restoration, the West is headed for mighty hard times.

Bowman is a resident scholar at the Ethics and Public Policy Center in Washington, which touts itself as an “institute dedicated to applying the Judeo-Christian moral tradition to critical issues of public policy.” He earned his bachelor's degree at Lebanon Valley College in Pennsylvania and his master's at Pembroke College, Cambridge University, England, and taught school in London. Living in Virginia, he is a prolific author and critic, published in many newspapers and journals in the United States and England. *Honor: A History* is his second book. His grasp of literature and films is impressive—even astounding. Bowman's father fought in the Philippines in World War II, and at the time of this writing, his son was serving in Iraq.

Bowman believes that honor comes in many shapes and sizes. Among them are personal and cultural honor. In its most primitive form, it involves having a high opinion of other people in one's honor group, be it a military organization, street gang, or whatever. For males, it includes a reputation for effective fighting and truthfulness—for females, a reputation for fidelity to the spouse and chastity. This is the concept of honor for radical members of the Islamic world, and it yields a huge advantage to them, at least in the short run. But in the West, honor has evolved through several phases until in the early twenty-first century, it hardly exists at either the personal or societal level. The built-in contradiction between traditional concepts of honor and Christianity has contributed to this change: bravery,

pride, and combativeness on the one hand and self-effacement, humility, and peace on the other. On the societal level, honor resembled prestige—states or rulers would possess it if the rest believed them formidable and motivated enough to defend themselves against insults.

For a time during the Victorian era, the two streams of ethics found an accommodation in manly Christianity, with the English gentleman serving as the model: a moral man who could stand up and fight for his principles. But according to *Honor: A History*, World War I, among other things, put that notion on the road to extinction (in the West). This horrible conflict discredited honor at the national level because young people perceived that a group of corrupt old men on all sides had put whole generations of youth on a slippery slope straight into the grave. Atop that, technology also played a role. The advent of the “pill” had a profound effect, coming as it did three decades after the “flappers” of the 1920s began the movement for sexual liberation. The second wave of feminism came along to achieve some worthy and even essential reforms—but also to help undermine what was left of honor. Vietnam pounded one of the final nails into the coffin of Western honor, and for the male, what emerged was the denigration of heroism or honor as inevitably a fake, and for the female, the end of chastity as a virtue worthy of honor. At the societal level, one could no longer claim to undertake a foreign-policy initiative for the sake of national honor or prestige. A kind of merging had occurred—one involving the need for prestige and the requirement that all war had to have a moral cause; everything else was phony. By our times, we had come to see heroism as fraudulent and victimhood as worthy of honor. Americans desperately sought reasons why their own country was at fault for provoking all sorts of outrages, such as the terrorist attacks of 1 September 2001. Feminism, psychotherapy, and Christianity had brought about the downfall of honor.

Bowman argues that honor must be made respectable at both the societal and personal levels if the West wishes to survive the onslaught of cultures that still follow the simple honor codes of ancient times. He argues that to prevail, the West must make personal honor a respectable motivator, allow its political leadership to take aggressive action to guarantee national honor, and move to make motherhood and fidelity to the family honorable for women who choose to follow that path (without repealing the

real and necessary reforms that feminists have achieved since Vietnam). The West must also increase its efforts to make military service a more respectable badge of honor again. Air warriors should put *Honor: A History* near the top of their reading list and read it soon.

Dr. David R. Mets
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Bomb Scare: The History and Future of Nuclear Weapons by Joseph Cirincione. Columbia University Press (<http://www.columbia.edu/cu/cup>), 61 W. 62nd Street, New York, New York 10023, 2007, 224 pages, \$27.95 (hardcover).

The modest size of this book belies its importance. In the compressed span of 157 pages of text, Joseph Cirincione provides an overview of nuclear weapons, the history of their development and deployment, the struggle to control their spread, and the dangers that they pose to us today in the form of nuclear terrorism. Well known in the field of nuclear strategy, he currently serves as senior vice president for national security and international policy at the Center for American Progress. Earlier, Cirincione served as director for nonproliferation at the Carnegie Endowment for International Peace.

Bomb Scare is clearly written and dispassionate. The work examines all facets of the nuclear equation, for instance, by giving the arguments for strong nuclear arsenals and then looking at the case for their reduction. Early on, Cirincione does make clear one assumption: that “the proliferation of nuclear weapons is undesirable” (p. xi). Especially useful for the military professional is the author’s tracing of attempts to control nuclear weaponry from the Baruch Plan of 1946 through downsizing of Cold War arsenals during the 1990s and beyond. Cirincione highlights the success of the Non-Proliferation Treaty (NPT). Going into effect in 1970, the treaty today counts 188 signatories, including the five countries (United States, Russia, Great Britain, France, and China) allowed nuclear weaponry; only India, Israel, North Korea, and Pakistan remain outside the NPT tent. The author estimates that without this agreement, as many as 40 countries—rather than the current nine—would be armed with nuclear weapons. The author argues that the NPT thus represents history’s greatest success in arms limitations by diplomatic means.

Cirincione gives credit for lessening the dangers of nuclear proliferation and reducing nuclear arsenals to countries as diverse as Ireland, South Africa, and Libya, as well as to a bipartisan slate of US presidents including Dwight Eisenhower, John Kennedy, Lyndon Johnson, Richard Nixon, Ronald Reagan, and George H. W. Bush. The author also singles out for their effective, albeit disparate, roles Mikhail Gorbachev, Colin Powell, Richard Lugar, and Sam Nunn. These last two, both US senators, were key figures in establishing the Cooperative Threat Reduction Program in 1991 to secure nuclear stockpiles in former Soviet republics. Most people have forgotten that in 1992, Ukraine figured as the world’s third-largest nuclear power with about 5,000 warheads in its inventory. Today, that country, along with Belarus and Kazakhstan, is no longer a member of the nuclear club. In fact, the world’s arsenal has dropped in the past 20 years from 65,000 warheads in 1986 to 27,000 in 2006 (with Russia holding 16,000; the United States 9,900; and the seven other nations about 1,000).

Today, of course, the greatest menace facing the United States is no longer a Cold War–style Armageddon but nuclear terrorism. Cirincione puts it well: “We no longer worry about the fate of the earth, but we still worry about the fate of our cities” (p. 85). As early as 1993, Osama bin Laden began hunting for nuclear weaponry; by the end of 2004, the author counts 18 confirmed incidents in which terrorists attempted to acquire highly enriched uranium or plutonium. In 2006 the author calculates that there is enough fissile material in the world for 300,000 bombs.

Given the scale of the problem, is a nuclear blow at one of our cities inevitable? Cirincione argues strongly that it is not. He believes that this threat can be reduced significantly by keeping the nuclear club small, by further cutting back existing stockpiles, and by tightly securing fissile materials. The author argues that the Bush administration should have pushed much harder for an acceleration of these measures and that its strategy of regime change rather than of weapons reduction was deeply flawed.

Among the many virtues of this slim volume are its excellent glossary, its thorough documentation, and its reliance on key primary and secondary materials. Its illustrative tables include those on nuclear stockpiles and the 50 countries possessing weapons-usable uranium. The debit side of the ledger looks slender. Too frequently, scholars known only in their fields are named without identification in the text. Although the

author's treatment of the role of the United States is appropriately strong, he does not examine the Soviet "side of the hill" in similar depth. Cirincione gives ample attention to the flurry of arms-control agreements that Ronald Reagan achieved during his second term but does not mention the president's radical—and almost attained—goal of abolishing all nuclear weapons held by the United States and USSR. The deal seemed on the verge of consummation at Reykjavik, Iceland, in October 1986 but foundered over Reagan's refusal to restrict the Strategic Defense Initiative to the laboratory. Indeed, the author overlooks the key work on this important topic: Paul Lettow's *Ronald Reagan and His Quest to Abolish Nuclear Weapons* (New York: Random House, 2005).

But place these few quibbles aside. Cirincione's *Bomb Scare* is a first-rate book. Accessible to the layman while offering fresh insights to the military professional and particularly to the Air Force community, this volume examines one of the most important challenges facing Americans today. It is essential reading.

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The Jet Race and the Second World War by Sterling Michael Pavelec. Praeger Security International, Greenwood Publishing Group (<http://www.praeger.com/psi>), 88 Post Road West, P.O. Box 5007, Westport, Connecticut 06881-5007, 2007, 248 pages, \$49.95 (hardcover).

Before receiving this book for review, I assumed it would just be one of many similar books describing the early age of gas-turbine engines in the 1930s and 1940s. I prepared myself for a relaxing read and did not expect much more than a rehash of often-cited information. I could not have been more wrong. Sterling Pavelec has extensively researched and written a very thorough historical examination of the early days of the gas-turbine engine in Germany, Britain, and the United States.

The Jet Race weaves the technical and political issues facing each program into a complete, historically accurate story. Other books on this subject dwell on the technical aspects and spend little time describing the "how" and "why" of decision making. As a result, those studies tell only half the story. To Pavelec's credit, he gives the reader a unique view of real-life issues faced by engineers struggling to develop a new technology and the problems they encountered with their

political and industrial bureaucracies. For example, on pages 56–58, the author describes the ongoing feud between Whittle's Power Jets and two other companies (BTH and Rover) contracted by the British Ministry of Aircraft Production to build the Whittle W.2 engine. During one dispute concerning Power Jet's technical drawings, Whittle discovered "that Rover had removed all reference to Power Jets from the blueprints" (p. 58).

Germany's military goals in the prewar years minimized many of the bureaucratic and industrial feuding problems faced by Whittle in Britain. Germany had a clear, overriding goal of developing advanced weapon systems, and many people recognized the gas-turbine engine as a key to aircraft superiority. Hans von Ohain's success with his centrifugal-flow engine helped fuel Germany's development of the more efficient axial-flow engine. Despite many early successes, the German turbine-engine program almost failed to mature when Hitler decreed in 1940 "that all military production projects that would not be operational in six months were to be scrapped" (p. 26). Both Heinkel and Messerschmitt ignored the order and continued development of their respective jet aircraft since both companies recognized the extreme advantage of this revolutionary propulsion system.

In contrast to Britain and Germany, who maintained active turbine-engine development programs, the United States lagged far behind in developing viable jet engines. As late as 1940, the National Advisory Committee on Aeronautics had decided that "they were unsuitable for aircraft propulsion, and research had been discontinued" (p. 74). Luckily, during a visit to Britain in 1941, Gen Henry "Hap" Arnold recognized the importance of the jet engine and quickly arranged an agreement for the United States to produce Whittle engines secretly at the General Electric (GE) plant in West Lynn, Massachusetts (p. 77). General Arnold also awarded contracts to GE and Bell Aircraft to build the first US jet aircraft—the XP-59A. Pavelec appropriately ends the chapter on the United States' early development by identifying the general as "the single most influential element in the . . . American jet program" (p. 90).

This book contains a wealth of information on early jet engines and their development. Besides the chapters that describe the three programs, the author includes a very interesting chapter on the operational record of the German jets. The book's appendices offer comparisons of

the three early jet engines, call signs of the early experimental aircraft, biographical information about the main proponents, comprehensive notes that provide additional background to each chapter, and a superb bibliography for further reading. Individuals interested in the early history of the turbine engine should definitely add *The Jet Race* to their libraries. I am sure they will read it more than once.

Rick Kamykowski

Arnold Engineering Development Center, Tennessee

Rockets and People, vol. 1, and **Rockets and People: Creating a Rocket Industry**, vol. 2, by Boris Chertok. NASA History Office (<http://www.hq.nasa.gov/office/pao/History/index.html>), 300 E Street SW, Washington, DC 20546, 2005, 402 pages, \$42.00 (hardcover) (vol. 1); 2006, 669 pages, \$25.00 (hardcover) (vol. 2). Available free online at <http://history.nasa.gov/SP-4110/vol1.pdf> and <http://history.nasa.gov/SP-4110/vol2.pdf>.

In this initial two-volume set, Boris Chertok chronicles Soviet air and space development through approximately 1960, drawing on his six decades of experience as one of Moscow's foremost air and space engineers, engaged in nearly all major projects. The National Aeronautics and Space Administration plans to publish volumes three and four (concerning Moscow's space program in the early-to-mid 1960s and the moon shot in the late 1960s, respectively) in 2008–9. Translated from the original Russian (published in Moscow as *Rakety i lyudi*, 1994–99) and substantially revised, the series is edited by noted space historian Asif Siddiqi. In these volumes, Chertok offers unique historical insights and documentary references, many previously unavailable in the West, thus giving the reader penetrating views into an era in which “rocket-space technology became one of the determining factors in the politics of the leading nations” (vol. 1, p. 8).

In one interesting revelation, Chertok writes that China is not the only nation to have conducted a live test of a nuclear warhead atop a missile (as suggested in *Thread of the Silkworm*, Iris Chang's biography of Qian Xuesen, the father of China's missile program, p. 222). A decade earlier, on 2 February 1956, the Soviet Union fired a nuclear-armed R-5M missile 1,200 miles to create a nuclear explosion near the Aral Sea (vol. 2, p. 284). Chertok later recounts a proposal, fortunately abandoned, to “deliver an

atomic bomb to the Moon and detonate it on its surface” (vol. 2, p. 440).

Volume one covers Chertok's early career, including his assistance in relocating Soviet aeronautical infrastructure to the Urals to avoid Nazi attacks and his assessment and extraction of Nazi rocket expertise in postwar Germany. He recounts early Soviet development of aviation, which Stalin regarded as a critical industry in the 1930s and renewed support for during World War II. Chertok acknowledges that despite this prioritization, many important Soviet military leaders did not fully appreciate the military significance of rockets and aircraft at the war's outset. Later they reversed their position and inhibited space developments, fearing that they interfered with the progress of weapons systems.

Volume two details Chertok's return to Moscow in 1946 to fulfill Stalin's charge to develop a missile program and his subsequent role in establishing Baikonur Cosmodrome in Kazakhstan. Chertok also records the development and launch of such satellites as Sputnik (in 1957) and of lunar and interplanetary probes. In addition to these successes, he acknowledges such failures as the R-16 rocket explosion in 1960 that killed Marshal Mitrofan Nedelin, head of Soviet strategic missiles, and scores of top engineers. Throughout volume two, Chertok recounts relations with former boss and chief designer Sergey Korolev, long recognized as having led the Soviet space program until his untimely death in 1966. The author offers probing insights into the political system that facilitated Nazi Germany's cutting-edge missile advances, which in some ways actually helped Hitler lose World War II by diverting resources from the development of aircraft and atomic capability.

Some will undoubtedly disagree with Chertok's views concerning many critical issues of his time, particularly his somewhat utopian characterization of technocratic policies as a panacea and of Soviet militarism as primarily a reaction to provocative American policies. In Chertok's assessment, Moscow “won the nuclear missile race, but lost the moon race” (vol. 1, p. 27). The latter point will meet with little disagreement in the West, but his insistence that “according to some indicators, we passed the United States in terms of nuclear missile armaments” (vol. 1, p. 27) seems insufficient to support the former statement, given Moscow's inability to sustain funding for its inefficient military-industrial complex. Chertok arguably exaggerates the benefits of centralized technological development in iso-

lation from the West, insisting that his country “by the end of the 1970s . . . had the strongest technocratic elite in the world” (vol. 1, p. 7). He minimizes unduly the contributions of German engineers to Soviet rocket development—German V-2 technology was essential to the Soviet Union, just as it was to the United States. Many veterans of the Apollo program would also differ with Chertok’s assessment that the structure of Moscow’s centralized design bureau was superior to Washington’s private-contractor system, which “wasted weeks coordinating complex issues between companies and drawing up protocols” (vol. 2, p. 513).

Nevertheless, Chertok is to be commended for his frank acknowledgement of many of the Soviet Union’s shortcomings, such as those of its political system. These included the terrible cost of purges, stifling ideological repression, censorship of key technological knowledge, falsification of rocket-reliability figures, and systematic suppression of even the most talented Jewish technocrats under Stalin: “Even scientific problems that were far removed from politics and ideology, such as matters of rocket stability, could acquire political overtones” (vol. 2, p. 64). Later, even under Khrushchev, a major supporter of rocket development at the expense of aviation, superficial space spectacles were prioritized, often with unrealistic deadlines, and “the fate of intercontinental . . . missiles was decided at such a high governmental level and at such a low scientific and military technical level” (vol. 2, p. 236).

At the same time, Chertok’s minute detail helps explain not only the failures engendered by the Soviet system but also the many air and space successes. Specialists striving to understand why China has yet to emulate Soviet development of manifold, relatively sophisticated indigenous weapons systems will notice (1) Moscow’s significant human and natural resources, which it harnessed—particularly following World War II—in the development of a massive scientific, technical, and industrial infrastructure; (2) the postwar emergence of a generation of technocrats with formidable prestige and power to administer this prioritized establishment; and (3) following Khrushchev’s courageous de-Stalinization efforts, the relative protection of the best Soviet minds from repression and turmoil—provided that they did not, like foremost nuclear physicist and later Nobel Peace Prize-winning dissident Andrei Sakharov, seek political change. Of particular note are the significant financial and material incentives provided to the

best Russian experts and even the German specialists who initially served them. Chief designers such as Korolev not only were authorized substantial bonuses by the Council of Ministers but also were empowered to confer modest cash awards on subordinates.

Despite the staggering amount of data conveyed, Chertok’s numerous technological analogies and vivid anecdotes make for lively, accessible reading. He thus succeeds in his mission to document the contributions of a cadre of Soviet men and women to humankind’s initial steps into the heavens, despite great turmoil and trials back on Earth. While it is tragic that communist policies prevented many of these talented and dedicated individuals from being recognized internationally during their own lifetimes, Chertok has ensured that their legacies will not be lost to history.

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George C. Marshall: Rubrics of Leadership by

Stewart W. Husted. Army War College Foundation Press and Stackpole Books (<http://www.stackpolebooks.com>), 5067 Ritter Road, Mechanicsburg, Pennsylvania 17055-6921, 2007, 300 pages, \$23.95 (hardcover).

Prof. Stewart Husted’s book on George C. Marshall is a college leadership textbook based on the general’s life. The “architect of America’s Victory” in World War II, Marshall served as secretary of state and, later, secretary of defense. His plan to rebuild Europe after World War II earned him the Nobel Peace Prize in 1953.

The general’s long and successful career includes many examples of leadership. Drawing on Marshall’s life, Husted selects between four and nine rubrics of leadership for each of the 11 chapters of the book. The 71 rubrics offer excellent material for initiating class discussions.

Such discussions could emphasize Marshall’s life or some of the more current historical events mentioned in the book. Students could apply and debate the American traditions of military leadership that Husted covers, such as courage, self-discipline, integrity, civilian control of the military, and the importance of military members taking a nonpartisan view of political issues. The author includes both positive and negative examples from Marshall’s career so students can discuss and learn from his successes as well as mistakes.

Having previously written a book on Marshall (*George C. Marshall: A Marshall Plan for Leadership and Selfless Service*, 2004), Husted knows his subject well. He uses the general's life and papers to write a text similar to some of the recent books about the leadership of great men such as Lincoln, Grant, Lee, MacArthur, Eisenhower, and others (including a humorous text on Attila the Hun). Although many of these studies focus on tips for executives and businessmen, Husted's primary audience is the college student planning a military career.

Granted, Marshall's life of service offers an incredible role model for leaders, but this book's focus is so narrow that it will appeal only to college students and professors who use it for leadership classes. In it, they will find wonderful examples, 24 photographs, an index, and numerous footnotes. Others should seek out a detailed biography of Marshall to learn more about the life of this great American hero and to reach their own conclusions about the lessons that his life illustrates.

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Dealing with Dictators: Dilemmas of U.S. Diplomacy and Intelligence Analysis, 1945–1990 edited by Ernest R. May and Philip D. Zelikow. The MIT Press (<http://mitpress.mit.edu>), 55 Hayward Street, Cambridge, Massachusetts 02142-1493, 2007, 243 pages, \$54.00 (hardcover), \$27.00 (softcover).

This book is a collection of case studies developed for the intelligence and policy course offered between 1986 and 2002 at Harvard University to senior government and military intelligence officials to make them more adept at analyzing situations in which intelligence drives policy—and more aware of the cloudy environment in which such decision making occurs. The introductory material explains the nature of the course and defines the decision-making process that it teaches. Then the authors present six case studies—cowritten by the editors and other professionals. Arranged chronologically, the cases include the collapse of China, the United Nations intervention in the Congo, the removal of the Shah of Iran, the US relationship with Nicaragua's Somozas, the fall of Ferdinand Marcos in the Philippines, and the run-up to Iraq's invasion of Kuwait. The studies cover both Democratic and Republican administrations from President Truman to the first President Bush.

The editors claim that the case studies are straight reporting. For the most part, that seems to be the case. There is little opinion or analysis in the text. In the footnotes, however, the authors sometimes cite players whose assessment of a given situation may or may not be fully objective. Overall, the studies avoid bias or Monday-morning quarterbacking—and the avoidance of bias or second-guessing is one of the goals of the program.

The final chapter purports to deliver lessons learned—to apply the paradigm to the cases. It provides a rationale for including each particular case but fails to explain what in each case fails to meet the model. This section seems a bit perfunctory, including little more than two pages per case study. The recommendation for the fall of China calls for the analyst to think like George Marshall. That's all well and good, but nowhere does the work define Marshall sufficiently to allow that.

The book does not hold together as a stand-alone study. The descriptions of the crises show them unfolding as decision makers and advisers work from their differing perspectives with their different levels of information, insight, and understanding. Complicating the process is the inevitable partial or erroneous information that US personnel have to deal with. This part of the book is extremely good, but it provides little information that is really new. We have long known about the fog of war and the inadequacy of intelligence gathering with too few native-seeming boots on the intelligence ground. We have also known about hidden agendas and flat-out mistakes by both the intelligence community and the political leadership. What we need is something to help us detect and overcome these flaws.

This book does not provide any new answers. It works on a descriptive level but fails in analysis. That seems to have been largely the case with American intelligence gathering for many decades now.

Assessing *Dealing with Dictators* as a stand-alone document is unfair. The true test comes in a classroom when analysts shed long years of experience and role-play the crises as decision makers. Assuming a competent instructor, these scenarios will serve as the basis for raising awareness of how much harder it is to handle a crisis in real time than in retrospect.

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